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Railway Age

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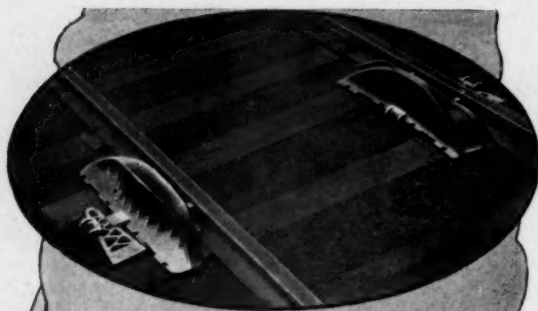
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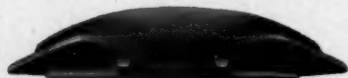
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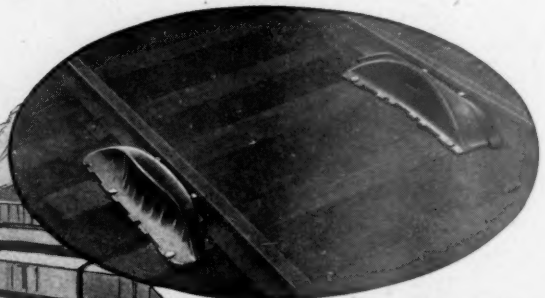
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EDITORIAL

Railway Age

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F. W. Pfleging, chairman of the Signal section, American Railway Association, in his opening address at the third annual meeting, touched on a point of great importance in recommending the appointment of a Committee on the Economics of Railway Signaling, this committee to make recommendations

Economics of Train Operation

for the handling of traffic by signal indications and the operation of outlying switches by remote control to increase efficiency and economy in train movements. It was suggested that this committee be composed of representatives of the operating and of the signal departments. However, train operation is so closely allied with a number of departments that it would appear advisable that representatives of the telegraph and mechanical departments serve on such a committee. The scope of work could be greatly extended by making studies showing the savings accomplished, turning some of the so-called "intangible" ones into the tangible form of dollars and cents. All admit that signals facilitate traffic and promote safety, but what does an hour saved in train movements mean in dollars and cents and what is the actual money saved by preventing unnecessary stops for the delivery of train orders or for taking sidings or stopping at non-interlocked grade crossings? A study of the subject should take into account wear and tear of equipment, fuel consumption and numerous other items; and it appears to be one well worthy the consideration of the American Railway Association.

One of the most marked developments in the design of shop, enginehouse and freight house buildings in recent years

More Light In Railway Buildings

has been the increased attention which engineers are giving to illumination, natural and artificial. Conditions are particularly adverse in an enginehouse with its constant cloud of smoke and steam. They are scarcely less severe in the average shop. But curious as it may seem, the value of adequate light in such buildings was not fully realized until recently as will be shown by an inspection of almost any building of this character built a decade or more ago. It is not many years since the action of a progressive eastern road in whitewashing the interior of its blacksmith shop at frequent intervals as a measure for increasing production was heralded as an innovation. More recently building engineers have replaced solid walls pierced by small windows with great areas of metal sash as illustrated in the new Monon shops at Lafayette, Ind., described on another page of this issue. In this building 80 per cent of the wall area is of glass. Nearly the same proportionate area is glass in the new roundhouses built by the Pere Marquette at Saginaw, Mich., and New Buffalo, as indicated in a description of the latter which appeared in the *Railway Age* of March 11. Almost equal attention is being given to the artificial illumination of these buildings by flood lighting and other means of electrical illumination. This increased attention to light is resulting from the growing realization that a workman can do more and better work in adequate light while incurring

less danger of accident; likewise, in freight-house construction where the improved lighting makes for accuracy in reading markings. Rapid as the progress in the provision of increased attention to lighting has been in recent years, railway engineers can afford to devote still more attention to it, for even a further advance can be made in railway building construction.

With the economy of timber preservation positively established, it is difficult for the layman to understand why

Why All Roads Do Not Treat Ties

the railroads do not use treated cross-ties universally. The answer would appear to lie in the fact that few investments for betterments made by the railroads are so long in paying a return, even though the ultimate gain from such an investment is absolutely certain. Until nearly all of the old untreated ties have been replaced, the annual renewals are determined, not by the average life of the treated ties, but by that of the untreated ties being replaced. Consequently, the advantage to accrue from the greater outlay for treated ties does not assert itself for a period equal to the average life of the untreated timber. But added to this natural obstacle is an artificial one imposed by the Interstate Commerce Commission. Whereas the added outlay covering increases in weight of rail and other items of roadway betterment are chargeable to capital account, no portion of the expense involved in the transition to cross ties subjected to preservative treatment may be handled in the same way. In other words, the road which decides to replace untreated ties with treated ones must carry the added cost in its operating expenses and as a consequence, the expense for tie renewals must be considerably above normal for the period of from five to nine years before the increased life of the treated timber will become effective in reducing cross-tie renewals enough to offset the cost for the preservative process. That it would be difficult to formulate satisfactory rules for capitalizing the change to treated timber is conceded. Timber preservation covers a wide range in the degree of perfection and refinement. Careless, indifferent or unscientific methods, might easily neutralize all the potential advantages to accrue under properly conducted work. Nevertheless, the change to treated timber is a true betterment which should be recognized in some manner in the accounting. The fact that any management which undertakes this betterment must be penalized by increased operating expenses over a period averaging seven years is unquestionably the most serious deterrent to the introduction of the preservative process on many railroads, and there is no question but that a great impetus would be given to this agency for conservation if the Interstate Commerce Commission would recognize the equity of a capital charge for the added outlay during the period of transition. Until then it is up to the directors of the roads to recognize that this movement for real economy involves an added operating outlay for a considerable period and due allowance must be made therefore in passing on the annual operating results, obtained by those in charge of the properties.

Only eight weeks have elapsed since a new record for idle cars was established. At the present time the surplus is still

**Is a Car
Shortage
Imminent?**

almost as great as existed at the beginning of 1919, during the recession in business following the armistice. Despite this enormous surplus, the country is certain to have a car shortage within two months if the present rate of increase in traffic and in bad order cars continues. Between January 1 and April 8 the idle cars increased from about 200,000 to 507,274. This was the maximum and there has been a fairly steady reduction since that time. On April 30 the surplus was 482,076 and on May 15, 450,164, a reduction of 31,912. During the same interval there was an unprecedented increase in the number of bad order freight cars. On January 1 there were 191,234 of all classes unserviceable and there has been a continuous and rapid increase ever since. On May 1 the bad order cars numbered 309,971, and on May 15, 324,969. These figures are all based on the Class I roads. Since the bad order cars are included in the idle cars, the margin of serviceable cars not in use is the difference between the bad order cars and the idle cars, which amounted to 172,105 on May 1 and 125,195 on May 15, a decrease of 46,910 in two weeks. It is evident if the number of serviceable idle cars continues to decrease at the rate of 23,000 a week, there will be a car shortage within six weeks. The situation is sufficiently serious to demand immediate attention. In the normal annual variation of traffic there is usually a gradual increase from April until September or October when the maximum is reached. There is reason to believe that the present increase in traffic is not a temporary revival, but that the improvement will continue. An actual car shortage with over 300,000 cars idle, but all unserviceable, would be a novel situation but one that could never be explained to the satisfaction of the shipper. The first step necessary to ward off such a shortage is to decrease the number of bad order cars. There were 93,279 cars requiring light repairs on May 15 and these can probably be returned to service with little delay. The heavy bad orders amount to 10.1 per cent of all the freight cars and present a serious problem. All of them need extensive repairs. Many are not fit to remain in service, yet they may be badly needed. This is an opportune time to make a careful survey of freight car conditions to determine which cars are to be repaired and which replaced with new equipment. Unless this is done there is danger that new cars will not be obtainable promptly and the demand will be so insistent that the railroads will be obliged to perpetuate obsolete and uneconomical equipment.

The Vast Purchases of the Railways

THE PURCHASES AND STORES SECTION of the American Railway Association met in Chicago this week. How many people in the United States, or even how many railway men, have any adequate conception of the magnitude of the business which is handled by the railway officers who compose the Purchases and Stores Section?

These officers include the buyers of the railways. They do not determine all the things that shall be bought, but they have very great influence in determining the things that shall be bought, and they carry on the negotiations incidental to the buying. It is necessary for each railway to keep on hand at all times a sufficient quantity of materials and supplies with which to make current repairs and replacements and also to make such improvements as are under way. The officers of the stores department have the responsibility of handling, distributing and accounting for all these materials, while the purchasing officers have the responsibility of seeing that they are bought at the best prices consistent with the

quality of the things bought. In addition, the purchasing department usually has, directly or indirectly, responsibility for the purchase of fuel. How large is this business of purchasing, storing and handling fuel, materials and supplies?

Some statistics recently compiled by the Bureau of Railway Economics make it practicable to answer this question more definitely and in more detail than ever before. A comparison of the figures for the year 1916 with those for the year 1920 will throw light not only on the magnitude of the business transacted, but also on the effects produced upon it by the increases in prices and other changes which have occurred within recent years.

In 1916 the Class I railways, exclusive of switching and terminal companies, paid \$250,544,862 for fuel. They charged \$119,785,157 to their operating expenses for depreciation and retirements, which in the long run represent expenditures for materials and supplies. They spent \$447,316,143 directly for "materials, supplies and miscellaneous," the "miscellaneous" being a comparatively small item. This made a total of about \$817,646,162 which was spent for fuel and, directly and indirectly, for materials and supplies. The foregoing figures cover only the items chargeable to operating expenses. As nearly as we can estimate, of the total capital expenditures made in the calendar year 1916 about \$209,100,000 was devoted to the purchase of materials. Therefore, in that year the total expenditures made by the railways, directly and indirectly, for fuel, materials and supplies amounted to about \$1,027,000,000.

In the year 1920 the fuel bill of the Class I railways, exclusive of switching and terminal companies, was \$672,891,964. They charged to their operating expenses \$145,252,339 for retirements and depreciation and \$1,063,769,900 for materials, supplies and miscellaneous. If we assume that one-half of their capital expenditures were made for materials, then on the basis of the estimate of the Bureau of Railway Economics regarding the total capital expenditures in 1920 the outlay for materials chargeable to capital account was over \$285,000,000. This makes a total for the Class I railways, exclusive of switching and terminal companies, of approximately \$2,167,000,000 which was spent in 1920 for fuel, materials and supplies.

It is not claimed for the figures given that they are exactly accurate. They undoubtedly are smaller than the total amounts spent by all the railways of the United States for fuel, materials and supplies, because they include nothing for the expenditures of the Class II and III railways or of the switching and terminal companies, which operate almost 20,000 miles of line.

In view of the magnitude of these figures it is hardly necessary to lay stress upon the importance of the work done by the purchases and stores departments of the railroads. In view of the fact that the figures for 1920 are more than twice as large as those for 1916, it is hardly necessary to dwell upon the extent to which the increases in prices have affected the operating expenses of the railroads.

Furthermore, it should hardly be necessary to do more than give the figures to show how important to the general business of the United States are the purchases of fuel, materials and supplies made by the railroads, and the effects upon general business which are inevitably produced by wide fluctuations in the amounts of these purchases. When the railways are financially able to make purchases on the scale required for the adequate maintenance and development of their properties they are the largest market for some of the largest industries of the country, especially those of coal mining, iron and steel and lumber manufacturing. On the other hand when, as has been the case within recent months, it is necessary for the railways drastically to reduce their purchases of all kinds and practically to suspend their buying of materials and supplies of many kinds, the adverse effect produced upon general business is tremendous.

It will be an auspicious day for the general business of the country when the purchases and stores departments of the railroads are enabled to resume buying and handling fuel, materials and supplies in normal quantities.

Reduction of Railway Wages

THE RAILROADS are again before the Railroad Labor Board requesting the restoration of the rates of pay for railway employees which prevailed before the wage increase of last July. Last week the Labor Board announced wage reductions which it estimates will cut about \$400,000,000 from the annual payroll. This announcement came after the board had received a large amount of evidence from the carriers regarding the decreases which have taken place in the cost of living and in the wages being paid in outside industries for work of a character similar to that performed by railway employees. The Labor Board split the difference, less than two-thirds of the increase of last July being eliminated. Railway executives expressed disappointment; employees' representatives are non-committal and by inference, satisfied.

The average annual wage per employee in 1914 was \$815.44. The wage award of last July made it \$1,926, an increase of 136.2 per cent. The cost of living at the time the award was made was 104.5 higher than in 1914, according to the National Industrial Conference Board's figures. The average railway employee, therefore, was awarded a wage when the cost of living was at its height which was 31.7 per cent higher relatively to the cost of living than he had received in 1914. The decrease just ordered by the Labor Board averages 12 per cent, thus reducing the average annual wage of the railway worker to \$1,694.88, or 107.7 per cent more than it was in 1914. But the cost of living since July, 1920, according to the Industrial Conference Board, has dropped approximately 40 per cent. The railway employee, therefore, instead of receiving an actual reduction in his wages, can, after his money wages have been reduced 12 per cent, buy 40 to 50 per cent more with his wages than in 1914. The average railway wage, measured in money, being, after the 12 per cent reduction, 107.7 per cent more than in 1914, compares very favorably with the increase of 89 per cent which the Department of Labor estimates took place in the average wages of employees in other industries between 1914 and May, 1920. Since that time there has been a decided decrease in general wages, but statistics are not yet available.

Even if the Labor Board were to grant the full requests of the carriers at this time the railway workers would still receive a "just and reasonable" wage measured by the cost of living and the wages being paid for comparable work in other industries. The increase last July averaged about 22 per cent. If all this were wiped out the average annual compensation per employee would be about \$1,581, an increase over 1914 of approximately 94 per cent, as compared with a cost of living which is now 63.6 per cent more than in 1914. The average railway wage would still have fully 30 per cent more purchasing power than before the war.

Many representatives of the employees recognize very clearly the favorable position of their constituency, and, despite public criticism of the board's ruling, have privately admitted its mildness, a few going so far as to characterize the wage cut ruling as a "victory" for the workers.

The carriers are again before the board reiterating their request for the restoration of the rates of pay in effect prior to the board's Decision No. 2, and substantiating them with additional data regarding the two relevant factors in the case, namely, the cost of living and the wages being paid for similar work in other industries. The Labor Board should, in fairness to the railroads and to the public, formulate a new order. The decreases in wages made should approximately restore the wages in effect prior to last July.

A Lesson from the Missouri, Kansas & Texas

THE RAILWAYS of the United States in the last four months of the years 1915, 1916 and 1917 had average net earnings of \$442,000,000 while in the last four months of 1920, under the present rates, they had net earnings of only about \$349,000,000, a decline, compared with the net earnings of the same months for the three other years mentioned, of 23 per cent. In the last four months of 1915, 1916 and 1917 the Missouri, Kansas & Texas had, on the average, net earnings of \$3,872,000, while in the last four months of the year 1920, under the present rates, it had net earnings of over \$5,375,000, an increase over its average net earnings in the same four months of the three years preceding government control of almost 39 per cent.

The Missouri, Kansas & Texas is not a large railway, according to American standards, but it operates 3,793 miles of line, and the fact that it showed in the last four months of 1920 so large an increase in net earnings under the present rates while the railways of the country as a whole showed a decrease, as compared with the three years immediately preceding government control, is a fact which is noteworthy.

The Missouri, Kansas & Texas has been in receivership since 1915. We publish this week the first of two articles regarding the improvement of its physical property and its operating and financial results in the years from 1913 to 1920, during which it has been under the present management. The facts given in these articles seem to make quite clear the reasons why its experience recently has been different from that of most other railways. The principal reasons are that a substantial amount of new capital has been invested in improvements in the property, and that the management has taken advantage of these improvements to increase the efficiency of operation. Since 1913 the average tons of freight carried per train has been increased from 299.4 to 504, or 68.3 per cent. In consequence, an increase of almost 74 per cent in ton-mileage has been handled with an increase of only 3.3 per cent in freight train mileage. An increase of 58.50 per cent in the number of passengers carried one mile has been handled with a reduction of 5 per cent in passenger train mileage.

Practically all the new capital which has been invested in the road under the receivership has been furnished by its creditors, since the new capital invested has been almost the equivalent of the accrued interest which the receiver has not paid. This, however, hardly constitutes an argument for bankrupting all the railroads of the country in order that the interest that otherwise would be paid by them may be invested in improvements. The bankruptcy of one or a few railroads has never caused a national financial catastrophe. The general bankruptcy of the railroads would ruin so many banking and fiduciary institutions and individuals who own their bonds and notes that it would be disastrous to every class of business concerns and individuals in the country.

The lesson which the experience of the Missouri, Kansas & Texas does forcefully inculcate is the desirability from the standpoint of the public of letting the railways earn net returns which will be large enough to enable them to raise sufficient new capital to make needed improvements in their facilities. Such improvements, as the experience of every railway which has been able to make them shows, not only enable the railways to handle a larger amount of business, but also to handle it at less cost than would otherwise be the case.

It is very difficult to make business men and farmers realize that in the long run they do not reduce, but increase, the cost of transportation to themselves when they hold down to the lowest possible limit the net return earned by the railroads. If the railways in the year 1920 had earned a net return of 6 per cent upon their valuation, the total net

return received by them would have been less than one-fifth as large as their operating expenses. Obviously, therefore, in the long run the extent to which the cost of transportation to the public will be reduced will depend mainly upon what permanent reductions are made in operating expenses. All the larger economies in operation, in turn, always have been and always will be obtained largely through permanent improvements in the properties. Improvements in tracks, terminals, locomotives, etc., have made it possible for the Missouri, Kansas & Texas to increase its average trainload so much, and thereby enabled it to handle a largely increased traffic without corresponding increases in the amount of fuel and materials used and the number of men employed. But improvements in the physical plants of the railways can be made only by the investment of new capital, and therefore when business men and farmers cause regulation unduly to restrict the net return that the railways earn they prevent from being made the improvements in the physical properties which are essential to substantially increasing the economy of operation.

While most of the railways of the United States under the present rates suffer from declines in their net earnings compared with pre-war years, some even when still handling a large business, like the Missouri, Kansas & Texas, showed increases in them. These increases in net earnings in every case were due to the fact that the operating expenses did not increase in proportion to the amount of business handled, and in almost every case where a railway recently has suffered relatively less from increases in expenses than its neighbors this has been due to the fact that within the last ten years it has suffered less than its neighbors from inability to raise new capital, and therefore has been able to make more economy-producing improvements.

Of course the lower in the long run the operating expenses of the railways are made the lower in the long run it will be practicable to make their freight and passenger rates. How long will it take to awaken business men and farmers of the country to the fact that in the long run prosperous railways will be able to serve them not only better, but at lower rates, than unprosperous railways?

Chicago, Milwaukee & St. Paul

THE CHICAGO, MILWAUKEE & ST. PAUL did not prove much of a money maker for the government during the period of federal control. It drew on the government heavily during the guaranty period from March 1 to August 31, 1920. In the period since the end of the guaranty period it has been operating at a deficit; it is not even making its operating expenses, let alone sufficient for its fixed charges. The standard return for the St. Paul was \$27,946,820, including extra compensation in the amount of \$440,000 to cover the installation of electric operation between Harlowton, Mont., and Avery, Idaho, which was completed prior to federal control.

The net railway operating income in each of the years 1918 and 1919 was less than \$4,000,000; approximating that figure in 1918, but nearer \$3,000,000 in 1919. In other words, in each of these two years the operations of the property yielded something like \$24,000,000 less than the standard return. In 1920 the operations of the St. Paul resulted in a net operating deficit as shown in the December, 1920, monthly report to the Interstate Commerce Commission, of \$5,819,216. The guaranty for the six months from March 1 to August 31, 1920, the guaranty period, would be one-half the standard return, or \$13,973,410. The net operating deficit for these six months was such that to make good this deficit and the guaranty the government has been called upon to pay no less than \$22,250,811 to meet the provisions of Section 209 of the Transportation Act.

Referring now to 1921, so that we may bring our figures up to date, we have available at this time the figures for January, February and March as shown in the monthly reports to the Interstate Commerce Commission. The net operating deficit, after taxes and rentals, for these three months was \$2,473,236. It is evident from this array of figures that the St. Paul was hardly benefited by federal control. The handicaps arising from federal control, combined with the sharp decline in business in the St. Paul's territory in recent months, give the officers of the property a real problem. There is very good reason for believing, however, that the problem will be solved if present adverse conditions of general business do not last longer than now appears probable. The present management is making energetic and successful efforts to advance efficiency of operation, and a substantial increase in the road's traffic undoubtedly would be followed by a great improvement in its financial results.

The Chicago, Milwaukee & St. Paul is a system with 10,634 miles of line, of which it owns 10,168 solely, 109 jointly and operates 347 under trackage rights. This mileage extends over eleven states. The St. Paul was in the earlier days of its history a granger road. With the building of its Puget Sound line it became one of the transcontinental carriers. The building of this line was intended to give the system an outlet to the Pacific coast, such as was obtained by the Chicago, Burlington & Quincy through its acquisition by the Hill lines. The outlay represented in the Puget Sound extension, the money that has since been spent on it for electrification, and the publicity that has been given these things make it difficult for an observer to realize that the St. Paul was a railroad system of considerable importance even before it reached the coast. Nevertheless, the building of the new line was a matter of no small importance, speaking comparatively, and its effect on the welfare of the system fully as great to warrant the great amount of discussion that has gone on concerning it.

The electrification of that portion of the line from Harlowton, Mont., to Avery, Idaho, 440 miles, was completed in 1915. In 1920 electric operation was begun on the section from Othello, Wash., to Tacoma and Seattle, about 200 miles. A new line, and a line built to such standards as this one, needs business and a large amount of it. It has apparently not had that business in sufficient quantity as yet, although it has done fairly well in spite of the competition of the strong and efficiently operated carriers which were in the field before it. The failure thus far to realize to a sufficient extent on the potentialities of the situation—or, in other words, the fact that the northwest has not yet realized to a greater extent on its own potentialities—explains much of the present difficulty of the St. Paul system.

The lumber industry is one of the most important industries, if not the most important industry, of the region served by the St. Paul. It has been idle for some months; cuttings have been kept down to an absolute minimum. The effect on the St. Paul's earnings can readily be appreciated when it is observed that products of forests constitute 20 per cent of the St. Paul's total tonnage. It is natural, speaking still of 1921, that the present decline in the business of the northwest, particularly in lumber, should have been so sharply reflected in the earnings of the St. Paul as it has been.

The St. Paul is one of the few roads that have made final settlements with the Railroad Administration for operations during the period of federal control. On November 1, 1920, it entered into an agreement with the Railroad Administration whereby it funded the cost of all additions and betterments to its properties, except as to equipment, in a note for \$20,000,000 payable March 1, 1930, and whereby it received in cash, in addition to sums already paid, \$13,750,000. This sum was applied in payment of a note of \$11,500,000 held by the War Finance Corporation and in the payment of the balance on notes held by banks, originally

amounting to \$4,000,000. The notes mentioned had been given in 1919 when the corporation, because of the withholding of its compensation, had to borrow money to meet interest maturities and for other requirements. "In negotiating this settlement," the annual report says, "differences developed between the claims of the company and the director-general, particularly those relating to maintenance expenditures, and rather than involve the company in prolonged and expensive litigation, the outcome of which would necessarily be uncertain, the board favored a final settlement at this time upon the terms above stated, believing it to be for the best interests of the company." In the situation, one cannot help but believe that had the road been in a stronger position financially, it would not have had to make this settlement with the Railroad Administration as quickly as it did and would probably have secured a larger payment than was made it.

The St. Paul carried more tons of freight in 1920 than it did in 1919, but the tons carried one mile were less because of a decrease as between the two years in the average haul. The freight revenue in 1920 was \$117,183,815 as compared with \$106,288,453 in 1919. The number of revenue tons carried in 1920 amounted to 45,041,277, the average haul was 253 miles and the total ton-mileage of revenue freight was 11,384,600,804. The tons carried in 1919 totaled 40,295,220; the average haul was 285 and the revenue tons one mile were 11,501,514,483. The St. Paul's revenue train load in 1920 was 544 tons, a reduction from the average of 554 in 1919. The 1920 average exceeded that for years prior to 1919, typical figures being 442 in 1916; 468 in 1917 and 532 in 1918. The average load per loaded car in 1920 was 25.48 tons; in 1919, 24.58.

One of the features of the St. Paul's operations during the past two or three years has been the large amount of new equipment which has been acquired. The company was allocated by the United States Railroad Administration 100 heavy Mikado locomotives and 3,000 box cars, which number was later increased to 5,000. In 1920, the road placed orders for an additional 100 Mikado locomotives. It also received during the year 15 electric locomotives for its electrified sections.

The figures for operation in 1920 compare with those for 1919 as follows:

	1920	1919
Mileage operated	10,624	10,647
Freight revenue	\$117,183,815	\$106,288,453
Passenger revenue	31,033,594	30,391,921
Total operating revenue	168,158,734	150,370,394
Maintenance of way expenses	28,810,633	23,144,811
Maintenance of equipment	41,557,151	40,422,005
Traffic expenses	1,725,763	1,107,107
Transportation expenses	86,276,148	69,288,819
Total operating expenses	164,697,121	138,561,705
Net railway operating revenue	3,461,613	11,808,689
Tax accruals	11,872,832	6,306,997
Railway operating income	Def. 8,451,167	5,362,271

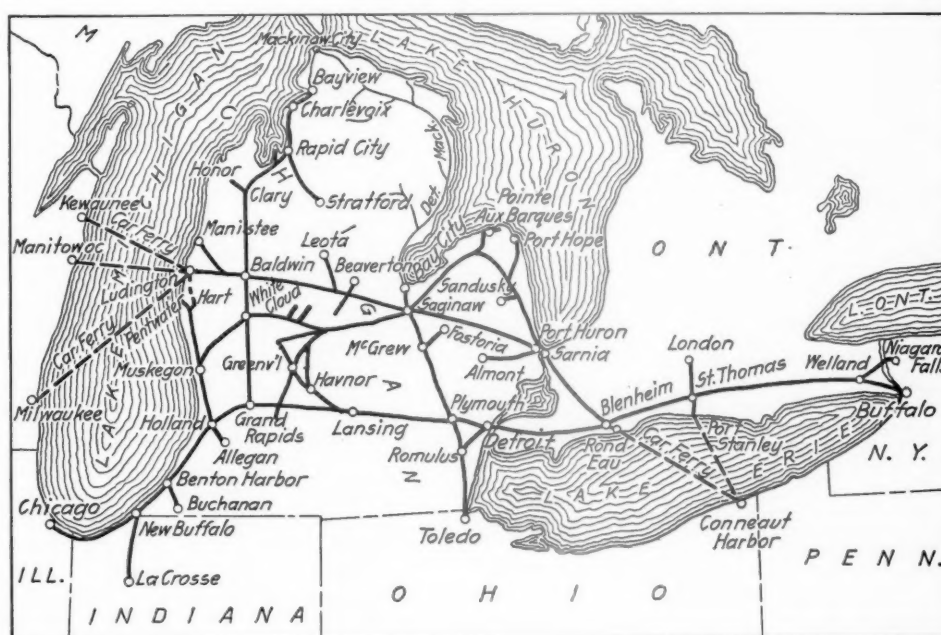
The corporate income account is as follows:

	1920	1919
Compensation accrued		27,945,820
Compensation, January and February	4,640,721	
Compensation under guaranty provision	22,250,811	
Railway operating income, March 1 to December 31	1,372,519	
Gross income	31,128,295	31,733,534
Interest on funded debt	17,593,581	16,690,835
Total deductions from gross income	26,762,224	24,090,489
Net income	4,366,071	7,643,045

Pere Marquette

THE PERE MARQUETTE was one of the few roads that elected not to accept the guaranty of net railway operating income embodied in the provisions of Section 209 of the Transportation Act. The earnings of the property while it was under federal control had been such that this decision seemed at the time it was made to be the proper one. The unusual events which characterized railroad operations in 1920, however, affected the road's operating expenses so drastically, without permitting compensating improvement in operating expenses, that the operations for the six months ended August 31 resulted in a corporate income account deficit amounting to \$46,286.

The earning power developed by the Pere Marquette during the period of federal control was one of the features of that eventful portion of American railroad history. The Pere Marquette had been following a somewhat rocky path, it having been in the hands of receivers from 1905 to 1907 and again from April, 1912, to the latter part of 1916. When the road was taken over by the government its standard return was set at \$2,932,162. In 1918, the first year of federal control, the operations of the property resulted in a net railway operating income of \$3,814,052, or about one-third more



The Pere Marquette

than the standard return. In 1919, when most roads suffered a pronounced decrease in net, the Pere Marquette proved very much of an exception. In that year, its net railway operating income was \$6,680,358, a yield to the government in 12 months sufficient to pay the standard return for the entire 26 months of federal control. The Pere Marquette proved a good money maker for the Railroad Administration.

President Frank H. Alfred in the annual report in explaining the reason for the decision not to accept the guaranty, says: "The Pere Marquette had demonstrated its ability, if unhindered by unusual and exceptional restrictions in the use of its property to earn a sum largely in excess of the standard return allowed. It was considered to be of vital interest to the public that any such excess so to be earned, should be, at the earliest opportunity used for betterments and additions to the property of the company." It was expected, he points out, that the net earnings from operation for the six-months period would approximate \$1,375,000, whereas the corporate net income based on the guaranty would have amounted to \$672,000. As already noted, the corporate

income statement for the six months actually showed a deficit of \$46,286. The reasons that the calculations failed to work out are, of course, well known. They include the outlaw strike of April, the Labor Board's decision in July, the fact that the increase in freight rates and passenger fares was not decided until August, etc.

The Pere Marquette was further handicapped because intrastate passenger fares in Michigan were not increased until March, 1921. Mr. Alfred estimates that the additional wages paid to employees under the Labor Board's award amounted to \$1,340,972 for the four months, May to the end of August. If the increased freight rates and passenger fares had been effective May 1, as, indeed, the directors anticipated they would be, it is estimated that the freight revenues for the four months would have been \$2,863,914 greater than they actually were in that period and passenger revenues \$580,480 greater, a total of \$3,444,394. The excess of estimated additional revenues over the actual amount of additional wages paid, the report continues, would have been \$2,103,423.

The Pere Marquette operates 2,239 miles of line of which it owns 989, controls 127 and operates 227 under trackage rights. The larger part of this mileage is in the state of Michigan. There are, however, lines to Chicago and Toledo and a considerable mileage in Canada. About half of the mileage operated under trackage rights is included in the connection to Buffalo and Suspension Bridge, secured by operation over the Michigan Central from St. Thomas, Ont. A feature of the Pere Marquette's operations is its car ferries which give the property access to connections at Milwaukee and Manitowoc, Wis., and at Conneaut Harbor, Ohio.

Considering the territory traversed by the Pere Marquette it is to be expected that no particular class of traffic would predominate; this is borne out by the following figures: products of agriculture, 13.2 per cent; products of animals, 1.36 per cent; products of mines, 46.40 per cent; products of forests, 8.71 per cent and manufactures, 16.90 per cent. In using these figures attention should not be lost of the Pere Marquette's traffic in and out of the Detroit district. Automobiles make about two per cent of the total tonnage but related products make up a large tonnage the size of which is not indicated by that figure. Because of its location the Pere Marquette is handicapped by having to pay prices for coal somewhat above the average, particularly because of the freight rate on the haul to the Pere Marquette lines. The road also has to meet large debit balances for hire of equipment, that figure in 1920 being no less than \$1,692,898, an amount greater as it happens than the interest on bonded indebtedness.

The Pere Marquette carried more tons of freight in 1920 than in any previous year but owing to a shorter average haul in that year, the ton-mileage of revenue freight was less than in 1919 or 1918. The number of tons of revenue freight moved in 1920 was 14,855,393, the average haul, 165 miles and the total revenue ton-mileage, 2,449,010,342. The revenue tons carried in 1919 totaled 14,783,616; the average haul was 170 miles and the revenue ton-miles, 2,511,959,726. In moving this freight the road secured an average revenue train load of 587 tons. This was a reduction from the figure of 604 in 1919 or that of 637 in 1918, but compared with 563 in 1917, which was the best train loading up to that time. The average revenue tons per loaded car in 1920 were 24.22.

The total freight revenues of the road in 1920 were \$29,754,566 as compared with \$26,504,204 in 1919, and the total operating revenues were \$40,372,814, an increase of \$4,929,678 over 1919. As against this increase in revenues, there was an increase of \$9,883,227 in operating expenses, the total operating expenses in 1920 amounting to \$36,731,955. The operating ratio in 1920 was 90.98 per cent as compared with 75.75 per cent in 1919. The net operating

revenues in 1920 amounted to \$3,640,859 as compared with \$8,594,408 in 1919, a decrease of \$4,953,549. The reasons for this sharp decrease in net are plainly pointed out in the report in an interesting table showing the relation of labor, fuel, material and other costs to total operating revenues. The following selection of figures from this table hardly needs comment:

	1918		1919		1920	
	Amount	Per cent	Amount	Per cent	Amount	Per cent
Labor	\$12,694,169	43.84	\$16,531,391	46.64	\$22,938,954	56.82
Material and supplies	2,977,577	10.28	2,759,026	7.79	3,745,885	9.28
Fuel	3,218,971	11.12	3,346,947	9.44	4,985,520	12.35
All other charges	4,497,159	15.53	4,211,363	11.88	5,061,596	12.53
Total operating exp.	\$23,387,876	80.77	\$26,848,728	75.75	\$36,731,955	90.98

Labor costs, it will be observed, made up the larger part of the increase in operating expenses. The increase in fuel costs is also noteworthy. The Pere Marquette does not go through a coal country, with the result that it has suffered from the high prices of fuel coal. As far as 1920 was concerned it suffered also from uncertain deliveries and had to confiscate coal for fuel with resulting higher costs. The poor quality of fuel necessitated a greater consumption; the miles run by locomotives per ton of coal in 1920 were 12.5, as compared with 13.83 in 1919, a decrease of 9.62 per cent.

In addition to these figures showing the relation between labor, fuel and other costs, the annual report also has some interesting data on the matter of deferred maintenance, especially as to equipment. On January 1, 1918, at the beginning of federal control there were in service on the road 398 locomotives good for a total of 2,694 months' service, an average of 6.769 months per locomotive. On February 29, 1920, at the end of federal control, there were 453 locomotives in service, including 58 new locomotives placed in service during federal control. The total months good for service was only 2,263 and the average per locomotive but 4.996. During the 26 months' period prior to federal control, 839 locomotives received general repairs; during federal control, only 639. The average mileage made by locomotives between general shoppings in the 26 months prior to federal control was 26,873; during federal control, 33,035. As far as freight cars are concerned the following figures will be of interest: in 26 months prior to federal control, cars receiving general repairs, 7,598; rebuilt, 6,265; in 26 months of federal control, cars receiving general repairs, 2,006 and rebuilt, 2,678.

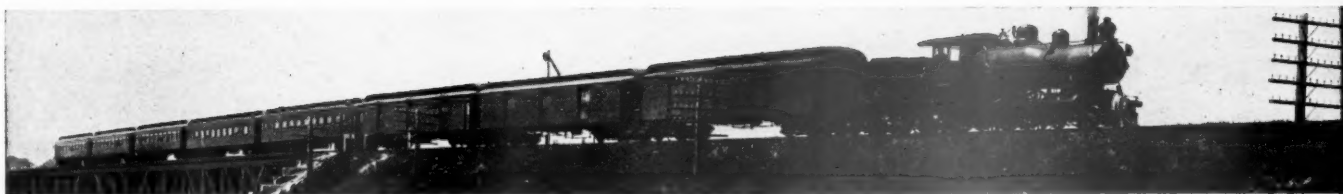
The corporate income account for the Pere Marquette shows for 1920 a surplus for the year's operations, including the standard return for January and February, amounting to \$1,393,973 after the payment of interest as compared with a surplus in 1919 amounting to \$1,896,931 in 1919 or \$1,894,125 in 1918. Dividends amounting to \$560,000 were paid on the prior preference shares. No dividends were paid, however, on the 5 per cent preferred stock either in 1919 or 1920; this stock is cumulative beginning January 1, 1919, and dividends on it would amount to \$621,500.

The figures for operation in 1920 compared with those for 1919 are as follows:

	1920	1919
Mileage operated	2,234	2,232
Freight revenue	\$29,754,566	\$26,504,204
Passenger revenue	6,938,505	6,127,461
Total operating revenue	40,372,814	35,443,137
Maintenance of way expenses	5,309,721	3,495,488
Maintenance of equipment	8,618,193	6,468,045
Traffic expenses	561,127	337,974
Transportation expenses	19,667,511	14,764,362
Total operating expenses	36,731,955	26,848,728
Net from railway operations	3,640,859	8,594,408
Taxes	1,073,822	762,283

The corporate income account is as follows:

	1920	1919
Gross income (including standard return, full year, 1919, two months, 1920)	\$6,433,365	\$3,744,772
Total charges excluding interest	2,801,100	121,294
Balance before deduction of interest	3,632,265	3,623,478
Total interest accruals	2,238,292	1,726,547
Surplus	1,393,973	1,896,931



Mechanical Department Must Tackle Big Program

Some Constructive and Practical Suggestions Which Will Bear

Rich Fruit if Followed Generally

THE INTENTION of this article should not be misunderstood. The mechanical departments of the railways have been subjected to much ignorant and malicious criticism during recent months. The really remarkable and steady progress which has been made by that department throughout the development of the railways of this country seem to have been lost sight of. True, the department is not perfect by any means—it never will be. It is, however, on a par with most other American institutions and organizations; in many respects—considering the conditions under which it is forced to operate—it is far ahead of most of them.

With proper backing on the part of the chief executives the capable and efficient leaders in the mechanical department will go steadily forward with the still larger program which lies ahead of them. The purpose of this article, then, is briefly to outline some of the more important parts in this larger program. It must be clearly understood that the things which are here set down are not dreams or vain imaginings of an idealist or chair warmer but rather that they

reflect the attitude and experiences of the foremost mechanical department officers—leaders who have demonstrated rare ability, who have the confidence of their associates and superiors, and who are going forward with a determination of securing an early and satisfactory solution of the great and complicated problems which now confront them.

The right solution of these problems will be a big factor in insuring the future stability and prosperity of American railroads. More than this it will have a large influence in the improvement of the railroad situation the world over since railroad officers in many of the foreign countries are looking intently to this country for inspiration and for guidance.

For convenience the program will be discussed under five heads: Management Problems and the Human Element, Getting the Most Out of Locomotives, Car Conditions Need Permanent Improvement, Speeding Up the Shop Production, and Increasing Engine Terminal Output. The study is not intended to be complete or exhaustive; it simply touches upon a few of the high spots.

Management Problems and the Human Element

A. H. Smith, president of the New York Central Lines, in testifying before the Senate Committee on Interstate Commerce said that "the efficiency of a railroad depends principally upon its men. It is estimated that 95 per cent of railroading is human."

**Develop
Real
Foreman**

Because the truth of President Smith's statement is generally recognized and because the foreman and subordinate officers form the only live contact between the men and the managements, the tendency to give more attention to the selection, education and training of the foremen and to the elevating and upholding of the dignity of their positions is becoming more and more pronounced. The foreman cannot function properly and efficiently unless he is fully informed as to the policies of the railroad and his particular department, and unless "he has at heart the interest of the company and of the men under him and will

painstakingly co-operate with and assist in every way possible those coming under his jurisdiction."

If able, capable foremen and subordinate officers are not provided it will be absolutely impossible to develop the right spirit and morale. Managements and men must work together in a common cause—a house divided in itself cannot stand—and yet how can this co-operation be secured if the aims, objectives and feelings of the men and the managements are not intelligently and correctly interpreted one to the other. The foreman is the keystone. Progressive industrial leaders and railroad officers have come to a strong realization of this and are giving special attention to selecting, training and cultivating these men.

How can real results be expected when the following condition exists: "The little fellow down the line has his troubles in a supervisory way, which to him are many times mystifying. This is due to the fact that he is following





orders which to him may seem very foolish because he has not full knowledge of the reasons for such orders. This then places him in the class of critics which destroys efficiency."

There are many things which may be done to overcome this condition and to strengthen the foreman so that he may intelligently put forth his best efforts to develop the right sort of co-operation and build up the morale of the organization. Here is what one road is doing: "Each car foreman has a book of instructions outlining his full tour of duty and we are now completing a locomotive book for the foreman in that department. In addition to this we use great care in issuing circulars; before they are sent out every man has an opportunity to pass on the proposal and to give us his suggestions. The result is that when the instructions are issued our men respond very quickly and realize the necessity for any modifications in practice which may be submitted to them."

"We have followed the practice of having the different classes of foremen meet separately each year, thorough preparation being made for each of these meetings which include the presentation of suitable reports and papers. In addition to these meetings for tool foremen, boiler foremen, air brake foremen, back shop foremen, etc., we have an annual car foremen's meeting, a traveling engineers' meeting and a master mechanics' meeting. Bronze tablets are presented each year for first and second prize stations for the locomotive and car departments separately. There is great rivalry among our various points; the award in each case is made by a committee of five judges."

"If a man understands what is wanted of him he is responsible if he goes wrong. If a man is not properly instructed and directed his superior is responsible." This statement has a peculiar significance for the railway mechanical department. With its great variety of equipment and with the forces scattered over large areas there is need for a painstaking and yet intensive, educational effort not only for the new men and apprentices but for men who have been on the job for months or even years, and yet have never had sufficient instruction as to exactly how important parts of their work should be done and who may not have a clear understanding of the responsibility which rests upon them. This is, of course, a question of supervision and is closely related to the problem of developing the right sort of foreman. It involves also, however, the development of accurate and complete schedules for shop and engine house practices. Some roads have made excellent progress in this direction with splendid results.

Instruct The Men Fully

The difference between work and play is largely an attitude of mind. When men can be encouraged to go at their

Playing A Game

work in a spirit of play they do more and better work with less fatigue. There is often just as much fun in making a record on a job, or in helping the department, shop or division to make a record, as there is in playing a spirited game. The successful supervising officer must be something of a promoter to secure this interest. There are numberless examples in railroad work of what may be done in this direction. Spirited contests to reduce accidents, to save fuel, to reclaim material, to cut down loss and damage, to increase car and train loadings, to increase production, etc., are familiar to all. It is the promotion of this spirit—and it can be done with small groups as well as large ones—that helps to locate and eliminate lost motion and waste. This spirit, however, cannot be developed by the mere issuing of orders or sending out of circulars; nor can a great deal be accomplished by correspondence, particularly that kind which is often carried on in railway service. Enthusiasm is contagious but it can best be transmitted by personal contact.

Recruiting The Forces

Modern apprenticeship methods have had a hard fight to gain a secure foothold on the railroads. Fortunately a number of officers with real vision have stood by through thick and thin. Conditions during the past few years have been hard to contend with and in many respects have been exceedingly discouraging; the clouds are breaking, however, and a goodly number of mechanical department leaders are going forward with renewed energy to carry on the good work and even to extend it beyond the field of training shop apprentices only. Changing conditions require different treatment and without doubt some radical improvements and modifications will have to be made in the methods of a few years ago. The fundamental principles, however, are sound and will serve just as well today as in the earlier days when modern apprenticeship methods were first introduced.

This brings us naturally to another development which has been gradually taking place in the mechanical department in recent years. Possibly the

Get Out On The Job

thought can best be developed by quoting from a letter which we have recently received. "You had an editorial a short time ago (*Railway Age*, April 22, 1921, page 965) which was very good and it would help the mechanical department to function better if it was followed—scrap 90 per cent of the typewriters and let the heads of departments and their subordinates do more super-





vising and not be confined to their desks trying to educate chief clerks in other departments and answering a great many foolish letters that would be better unanswered."

This sounds pretty strong and yet not a few mechanical department officers have refused to allow themselves to be buried in detail routine work and have personally cultivated their subordinates on the firing line with excellent results. Their personalities have been projected down through their subordinates to the very ranks and there has been a great improvement in the morale of the department.

There is a considerable interest among mechanical men on many roads as to the relative merits of the departmental and divisional types of organization.

Departmental vs. Divisional Organization Poor results are sometimes found on roads having the divisional form and where the operating officers have had no mechanical experience or do not

seem to have a proper appreciation of the importance of the maintenance of equipment. Both forms of organization have strong advocates; indeed there is so pronounced a difference of opinion that it would seem advisable to determine the special conditions which must be maintained to make the greatest possible success of either form. True mechanical department officers have little to say in the determination of the kind of organization which shall be followed; at the same time the importance of the mechanical department is such as to warrant a keen interest on the part of its officers in helping to determine the exact conditions under which either type of organization can function to the best advantage so far as the maintenance and operation of the equipment is concerned.

There has been a decided change in status of the mechanical department on many roads in relation to the railroad organization as a whole in recent years—largely since the entry of this country into the world war. The importance and necessity of keeping up the maintenance of the equipment in the interests of good business was strikingly demonstrated early in the war; as a result the head of the mechanical department has assumed a larger place in the organization than he was generally given in pre-war days. Many roads, however, are too far behind the procession in this respect. The recommendations of a chief engineer when he restricts wheel loads or speeds over a piece of track or a bridge are regarded as law. The advice of the mechanical department head, on the other hand, is disregarded in many instances when he protests against the running of inferior and unsafe equipment or insists upon the use of better equipment. Considering the danger of disregarding these protests and con-

sidering also the importance of the mechanical department and the amount of expenditure which is controlled by it the head of that department is too far removed from the chief executive on many roads. "When constructive ideas are developed by the mechanical department it often takes so long to go through the various channels before they reach the man in authority that by the time they do get to the president and the board of directors the father is frequently unable to recognize his own child. In such cases a mechanical department head to accomplish anything requires more perseverance than mechanical skill."

There are those who contend that the head of the mechanical department should have the standing of a vice-president and report direct to the chief executive who should listen to the comments of a seasoned mechanical department officer who stands exceedingly high in the councils of his road. The chief mechanical officer should at least report directly to the operating vice-president. "Outside of dictating the business and financial policy of the road there is no other post of duty that requires a man with a clearer sense of just what his duties consist of and a complete knowledge as to how they shall best be performed, than that of the man in charge of the mechanical department. Locomotives, cars and roadway must be kept in condition to carry a train safely, of a weight and at a speed consistent with a safe, practical and approved earning operation. Anything below this standard of maintenance and train operation inevitably results in losses that consume the funds required for maintenance and dividends. The old cry of 'too poor to be economical' has been the pitfall for numberless unwary executives. Had they been guided by that time honored axiom of Anything worth doing at all is worth doing well, their managerial history and that of the property they supervised would have been written differently."

Not a few mechanical department officers have been following closely developments in other industries relating to the handling of men. It is becoming recognized more and more that a real study of the labor turnover, for instance, often locates weaknesses in the organization which can be readily overcome. Moreover it costs money to break in new men and the correction of these weaknesses not only increases the efficiency and promotes economical operation but it saves the trained men to the organization. The selection, training and promotion of men is receiving special attention on many roads. More of an effort is being made to assign the men to the kind of work best suited to their peculiar characteristics and efforts are being made to study the men individually and strengthen their weak points. These things

Questions of Personnel





are all exceedingly helpful in cultivating a right spirit and understanding between the men and the managements.

Standardized wage scales have had a deadening effect upon the mechanics. The men on some roads at least are

Incentive Wage Payment

apparently ready to insist upon a return of piece work. Mechanical department officers have been studying this question carefully and if piece work is re-installed it will undoubtedly be on a better and more stable basis than former methods which resulted from a gradual development in departing from the day rate basis. Some means must be devised to establish a basis upon which the rates can be developed so that as the costs of living change the prices can readily be readjusted. Suggestions along this line were made in an article by G. W. Armstrong in the *Railway Age* of May 20, 1921, page 1157.

The following extract from a letter of a mechanical department officer speaks for itself: "No matter how hard

Opportunity For Promotion

a man tries to give his best, he cannot render one hundred per cent or more without interest and enthusiasm. Interest and enthusiasm in a job cannot be bought; they must be given. They may be encouraged and nothing encourages this spirit so much as hope for and opportunity of promotion. The best paid executive positions are in the operating department. Mechanical department men are seldom appointed to positions of superintendent and to the higher operating positions.

"The experience of some roads at least has demonstrated that men who began their careers as stenographers and clerks can be developed into capable administrative officers. They were given opportunity. They were given a chance to develop. Possibly these men might not be artists at tamping a tie; possibly they might not be able to run a transit as well as some others, but as they have advanced, they have absorbed information and knowledge by observation and contact and they have developed executive ability. Many master mechanics and other men trained in the mechanical department are equally capable of absorbing and advancing if they are not kept on a siding with the switch stand locked.

"Do the higher mechanical officers endeavor to shove their subordinates over into other channels where they can go ahead? Do they endeavor earnestly to find opportunity for their subordinates? Do not some mechanical officers labor under the delusion that unless a man is capable at every job that any machinist, boilermaker, blacksmith or other mechanic has had to do, or may ever have to do, he is unfit to hold a higher mechanical position? Have not the machinists who have advanced to be master mechanics, superintendents of motive power, etc., absorbed useful information on locomotive operation, boilermaking, pattern making, car work, dispatching and to some extent on auditing accounts? They can absorb still more. Others can absorb. Encouragement to learn and opportunity to advance will help any ambitious man to add to his efforts to make the mechanical department function more efficiently and more effectively."

Getting the Most Out of Locomotives

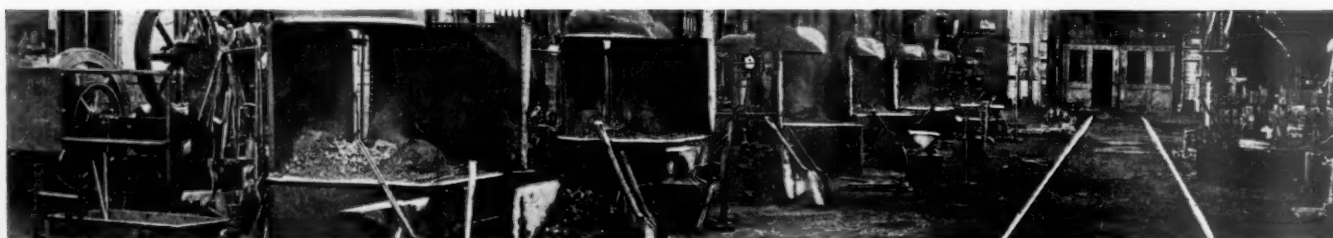
Locomotives built today must operate not only next year, but 20 years from now. They must be built with an eye

Build for the Future

to the future and, therefore, the mechanical officer tries to incorporate in new power every worthy improvement, realizing that progress is certain to continue and the best today will be scarcely good enough to "get by" a few years hence.

The efficiency of the locomotive as a heat engine has been nearly doubled within a decade, yet the future promises to bring developments of equal importance. The study of combustion has led to a better understanding of firebox and boiler design, and new types are being evolved as a result. The feedwater heater has passed through the experimental stage and may now be regarded as having established a definite place in future construction. Superheating steam

to an extremely high degree has been tried and its feasibility determined. Improved methods of creating draft are now receiving close attention. Alloy steels have been used to reduce dynamic augment with varying success; the benefits that will accrue are so great there is no question that the trials will be continued until a thoroughly satisfactory material is found. Devices for increasing the tractive effort at slow speed utilize idle weight and improve the tractive power characteristics of locomotives built with trailers. These and other promising innovations are, or soon will be available and as in the past mechanical department officers will play a large part in overcoming the difficulties in their application. Much could be done to accelerate development by preliminary trials on a test plant and it is to be hoped that arrangements can be made for co-operative research at some of the laboratories available for this work.





Fifty-five per cent of the total operating expenses of the railroads is affected to a greater or less degree by the character of the motive power. Because its influence on operation is so far reaching, the locomotive is the most important single factor in the operation of the roads today. Executives

Locomotives, the Vital Factor in Operation

are looking to it more and more as the instrument for cutting the cost of handling traffic. But whether it is a question of designing a new class of locomotives for special conditions, or of distributing the power to get the best results, an intimate knowledge of locomotive characteristics as well as operating conditions is necessary for its solution. The selection of the most economical tonnage or the locomotive best adapted for the traffic requires familiarity with the tractive effort, fuel consumption and maintenance costs of locomotives which few operating officers possess. The mechanical department men are thus becoming more closely allied with those who must determine operating conditions to move the traffic with the least total expenditure.

The selection of new power is becoming an extremely complex problem. When locomotives varied in few particulars, except in weight and the sizes of cylinders and wheels, the choice of the proper design was a simple matter. Now there are available numerous devices to increase the loads that can be hauled, to save fuel and to reduce maintenance. The range of possibilities to effect good operation or bad are almost unlimited.

Closely related to the problem of design is that of the rehabilitation of old locomotives. Remarkable progress has been made in this direction during the past few years. However, there are still many locomotives in service that are uneconomical in the use of fuel and not sufficiently powerful for the service in which they must be used. Such power is only a liability from any standpoint. If kept in operation it is wasteful; if it is to be taken out of service a large charge to operating expenses must be made to retire it if proper depreciation reserves have not been set up.

Convert Old Engines Into Assets

The benefits of improving old locomotives can be obtained in two ways; first, by reducing the cost of operation and maintenance, and, second, by lengthening the service life and thus decreasing the yearly amortization. So many modern accessories are applicable to existing power that, from the engineering viewpoint, practically any old locomotive can be made as efficient as the latest improved design. There are, however, rather sharply defined limits to the changes that can profitably be made in an old locomotive. For many classes of service such locomotives are well adapted and the

extent to which the design can profitably be modified depends on the relative maintenance cost of the existing locomotive, the normal life that can be expected from the boiler, and the fuel consumption. This has been one of the most attractive fields for saving, because under suitable conditions large economies can be effected with a comparatively small expenditure.

To get the most out of the locomotives, they must not only be designed right, they must also be operated right.

Effective Utilization of Power

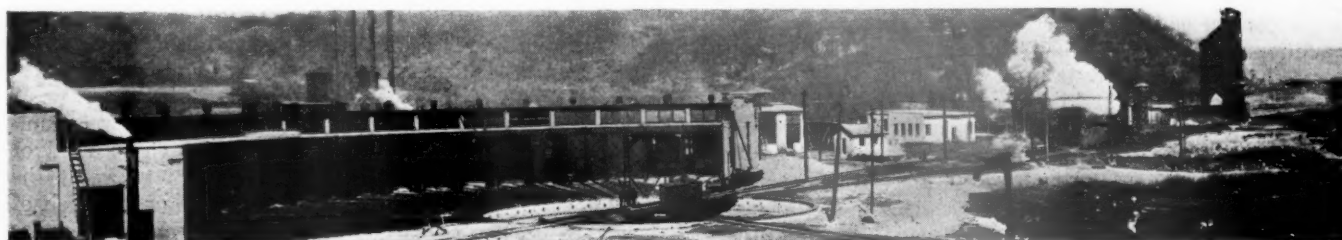
Adjusted tonnage rating, now quite generally used, insured proper loading, but failed to take into account the time element. One of the important advances in improved utilization came with the general introduction of the record of distribution of locomotive hours. The importance of this form is generally recognized and some roads have adopted special methods for insuring the accuracy of the records. If this feature is closely checked, the data becomes invaluable as a means of getting a higher percentage of time in revenue service and reducing delays and time in shops and terminals. The intensive use of power increases the locomotive miles per day, enables the efficient power to be used to the best advantage, and reduces maintenance costs and fuel consumption. Many roads are now running engines over two divisions with splendid success. Other systems are turning the engines without cleaning or dumping the fires and report a large saving in fuel.

Even more important than getting the most miles per locomotive is getting the most ton-miles. Adjusted tonnage rating, where carefully supervised, gives splendid results. Roads that have supplemented this system by dynamometer car tests have obtained some remarkable improvements in operation. Much of this work was postponed during the war, but a revival of traffic will no doubt find the roads again actively engaged in improving their power by scientifically checking its performance in every-day operation.

The condition of locomotives is seldom considered as a major factor in train loading, yet it has a very great effect.

Economy of a High Standard of Maintenance

One road found that with equipment in good condition the tonnage could be increased in some instances 300 to 400 tons per train, and double-heading could be eliminated. How can the highest standard of maintenance be assured? First and most important is thorough workmanship in the back shop. The majority of operations can be performed while the engine is receiving classified repairs for a fraction of what the work costs if done in the roundhouse. It is, therefore, economical to put the locomotives in condition for efficient con-





tinuous service while they are in the shop for overhauling. As long as the power is in service it should be maintained at the highest degree of efficiency until it is again due for classified repairs. This means that the stitch in time should be given rather than neglecting the engine until heavy repairs are needed and then trying to patch up the defects. One of the greatest aids in accomplishing this object is a definite standard of maintenance for the entire road. Systematic instructions for repairs are being adopted on numerous roads and the benefits are apparent.

Proper workmanship in the vital parts of the locomotive is absolutely necessary, but how is it to be secured with shops filled with "McAdoo mechanics" and jobs assigned according to seniority? The solution of the problem seems to be in the use of special men to follow the troublesome details. One road, for instance, has a man who does nothing else but look after valve motion on the entire system. He is able to check up waste of fuel at the source. Is this not more logical than leaving the detection of errors in valve setting to the fuel supervisors or traveling engineers who have no definite means of checking the cut-off unless the engine is so bad that it does not "sound square"?

Fuel economy is receiving close attention and now, more than ever before, careful supervision is warranted because

**Increasing
Ton-Miles Per
Pound of Fuel**

the cost of fuel absorbs such a large proportion of operating expenses. As an example, on one representative road the cost per 1,000 gross ton-miles increased 246 per cent from 1916 to 1920.

The reduction of the quantity of fuel used can be accomplished partly by improved equipment, but the greatest factor is the method of operation, irrespective of the equipment. The technique of full economy has been thoroughly developed and securing the best performance practicable is now a matter of administration. In considering this matter two features stand out clearly. First, so many departments are concerned in the conservation of fuel that the organization which is responsible for its use should not have its activities restricted to the bounds of a single department. Secondly, the individual enginemen, and especially the firemen, can effect large savings or cause great losses. Without their full co-operation the best results can never be attained. The fuel department head may be a capable engineer but unless he is also a promoter, unless he can sell the idea of fuel saving to the men, he cannot achieve the full measure of success.

More than the usual amount of trouble has been experienced during the war and since from failure of materials. One mechanical engineer states the problem concisely in the following words: "There is economy of maintenance and operation in purchasing durable material. Material that soon requires repairs, patching or renewal is expensive. During the period of the war, there was a liberal tendency to grant concessions in order to facilitate output. Wherever quality was sacrificed by these concessions, higher costs of maintenance and repairs followed the use of the lower grade material. Where quality was sacrificed, immediate steps should be taken to direct it toward higher grade."

With the proper workmanship and material, and systematic maintenance in the engine house, a definite service can be obtained from each locomotive between shoppings. In this connection a superintendent of motive power recently said: "We have given very close study to the shopping of engines on a mileage basis according to a treatise which was given to every locomotive foreman on the railroad. Shop scheduling of work and the fact that engines are not allowed to be taken into the shop without careful study and, furthermore, knowing that material and shop space is available in advance, have caused our power to be more carefully followed up locally on each division. Master mechanics now readily understand that they must get a certain amount of service out of their power and they, therefore, keep it up from day to day and are avoiding the former practice of wearing an engine out intensively, figuring they can send it to the back shop whenever they please."

A matter allied to locomotive maintenance which deserves at least passing comment is the question of cleaning engines. Few roads have a definite policy with respect to all classes of power and often the appearance is a reliable indicator of the condition of traffic: if revenues are ample, the engines are clean; if times are hard, they are dirty. If there is no economy in wiping, the practice should be permanently discontinued, but if it effects a saving, it is needed at one time as much as at another. If the appearance of the locomotive indicates to the engineer that the railroad is indifferent about the condition of the power, is it reasonable to expect that he will crawl among the dirty parts to make a thorough inspection, or be careful in handling it? The saving effected by keeping motive power clean can never be computed accurately, but the moral effect on the organization gives a handsome return on the money thus spent.

Car Conditions Need Permanent Improvement

On May 15 the Car Service Division reported 324,969 freight cars in bad order, 231,690 of which were in need of heavy repairs. This is a bad situation. Normally the bad orders should not constitute more than four or five per cent of the total equipment and during the months of heavy traffic last year they did not exceed eight per cent; now there are over ten per cent in need of heavy repairs alone. This extraordinary accumulation of run-down equipment is the result of the struggle for solvency which, during the past few months, has compelled many railroads to effect drastic

curtailments in maintenance expenditures without consideration of their ultimate wasteful effect.

Essentially, however, the present situation differs only in degree from that which periodically follows a decline in traffic. Whenever there is a surplus of equipment there is always a heavy movement toward home lines. Large numbers of these cars, which may long have been in need of heavy repairs, are set aside by the owners to await the much needed general overhauling. But, because of lack of adequate facilities or excessive curtailments of maintenance

expenditures, much of this equipment is still in need of heavy repairs when the succeeding period of increasing traffic compels its return to service.

During the period of heavy demand such cars appear repeatedly on the repair tracks, on each occasion to be patched up and moved on with the least possible expenditure. In the aggregate, however, the cost of maintenance under these conditions is excessive, the revenue service performance is seriously impaired and claims for loss and damage are excessive.

There are a number of conditions which, so long as they all continue, make any adequate permanent improvement standards of car maintenance and serviceability practically impossible. The first is the lack of an adequate financial surplus to permit an intensive program of maintenance during these periods of light traffic. The effect of this condition has been most marked during the recent business decline and it will probably always exert more or less influence on the maintenance standards of financially weak roads.

How general this influence will be is largely a matter of public policy and is not directly within the control of railway managements. There is ample room for betterment, however, by changing conditions which are within the control of railway managements either individually or collectively, through the agency of the American Railway Association.

From the standpoint of its effect on operating costs, service and the cost of maintenance, the worst condition is probably the perpetuation of weak equipment which should either be retired or adequately reinforced to meet modern service conditions. The cars within this classification, while they probably do not exceed 15 per cent of the total number of cars of railroad ownership, are the source of a much larger proportion of the total cost of maintenance and account for a large part of the accidents and loss and damage claims chargeable to freight cars.

Perpetuation of Weak Cars

The desirability of keeping cars with weak draft sills from interchange has been discussed for many years. In 1914 it first received serious attention before the Master Car Builders' Association and a provision, adopted by letter ballot, was added to Rule 3 to the effect that cars of less than 60,000 lb. capacity having short draft arms be not accepted in interchange after October 1, 1916. In 1916 the effective date was extended to October 1, 1917, because of the large number of refrigerator cars affected. In 1917 the date was again extended because of the material shortage existing at that time. In 1918 the time was again extended to October 1, 1920, and last year the effective date was set ahead to Oct. 1, 1922.

In 1918 a provision was added to Rule 3 requiring that after October 1, 1918, suitable reinforcements be applied to all cars of the weak construction as fast as they received general repairs.

Is it not probable that, should this provision fail to eliminate all of the cars of objectionable construction by October 1, 1922, the effective date of the ban on interchanging

these cars will again be moved forward? The time when the railroad may expect to be really free from this equipment probably depends entirely upon the extent to which the policies of the individual roads square with the reinforcement provision of Rule 3.

In the past year two other steps have been taken by the Mechanical Division to improve conditions caused by equipment of weak construction. These are the adoption of changes in Rules 114 and 120. The first recommends that where destroyed foreign cars are rebuilt on the handling line the original construction be modified to the extent of the application of metal draft arms, steel draft members, or other approved reinforcements. The second recommends the application of ends of box cars of the type specified for new cars when equipment with steel underframes requires extensive repairs to the ends.

It is significant that these provisions are recommendatory and not mandatory.

In the meantime, the evils resulting from the operation of weak equipment continue unabated and nation-wide in their effect. Is it probable that further direct legislation will prove to be more effective than that which already has been written into the rules?

Some conception of what it is costing the railroads to continue to operate cars with weak draft construction may be obtained from an analysis of car repair costs which was made in 1911 by F. F. Gaines, then superintendent of motive power of the Central Railway of Georgia, in which it was found that items connected with the draft gear and its attachment to the car accounted for 38.9 per cent of the cost of repairs, 28.4 per cent being chargeable to the item of draft bolts alone. That the equipment under consideration was not operating under the unfavorable conditions that prevail in many sections of the country is evident from the fact that draft timbers and longitudinal sills combined, did not exceed three per cent of the total.

On another railroad, during a recent period of 13 months, there were 889 wrecks or accidents caused by the failure of freight car parts. The largest single item in a classified list of the defects was 144 accidents caused by couplers pulling out. Including with this the other defects pertaining to the draft gear and its attachments, a total of 222 accidents, or 25 per cent of the whole, were attributable to the group.

The next largest single group of accidents was caused by arch bar failures which were responsible for nine per cent of the total. Add these to the draft attachment group and the sum amounts to 34 per cent, practically all confined to a small group of cars aggregating probably not more than 15 per cent of all the railroad-owned equipment in service.

This analysis suggests forcefully the extent of the losses other than the excessive cost of their own maintenance which are being sustained by the continued operation of these weak cars, since their retirement or adequate reinforcement would make it possible to eliminate practically all wrecks and the accidents attributable to these two large classes of defects.

The lading in these cars must frequently be transferred enroute. Apart from the cost of the transfer itself, it is an





exceedingly fruitful source of loss and damage claims. Few loads are transferred for which claims are not presented. Furthermore, an accident resulting from the failure of a weak car seldom occurs, that several other cars do not also appear on the repair track.

The question may well be asked, "If these things are true why does this equipment continue to run?" One reason is a general lack of service records of freight car equipment. Few roads are in a position to apportion to each class of freight equipment its share of the cost of repairs or the added operating expenses resulting from car failures. This is a fundamental defect which makes impossible intelligent decisions on questions of design, maintenance or retirement policies. This statement is not a reflection on the soundness of the judgment of car department officers; but good judgment is helpless without a sound basis of facts on which to act.

While the proper disposition of equipment of weak design is undoubtedly the most pressing problem pertaining to the

Can Maintenance Standards Be Improved?

permanent betterment of freight car conditions, there is still a large field for improvement in general maintenance policies. The two problems are very closely related and the same factors which so strongly tend to perpetuate cars of weak and unsafe design, exert a potent influence in preventing a generally higher standard of maintenance.

Little evidence is needed to support the statement that general standards of freight car maintenance are low. The conditions with which the grain shipping roads are confronted yearly during the heavy movement of the crops have repeatedly been referred to in discussions on the floor of the Master Car Builders' Association conventions and elsewhere, in which opinion has usually been divided on territorial lines. These discussions were only reflections of the fact that few railroads maintain the freight cars on their lines beyond the margin required to provide for the handling of the commodities with which they have to deal.

Looking at the situation from the standpoint of good public service and the best interests of the transportation industry, such standards of maintenance are indefensible. And yet under present conditions can any one say that such standards are not sometimes justified when the immediate interests of the individual road are under consideration? With cars in great demand the percentage of home cars on lines rapidly decreases until it seldom runs above 50 per cent and in extreme cases, such as existed last year, drops as low as 25 per cent.

During these periods a large percentage of such repairs as are made must be made on foreign lines. But there is little incentive for the foreign lines to make more than the repairs immediately necessary to keep the equipment fit to run. The direct benefit of any more than this amount of work would probably be derived by a connecting line. During such periods the owning lines have little opportunity to carry out extensive programs of improvement or heavy repairs and with prices for labor and material fixed on the present basis of bare cost plus overhead, many roads find it cheaper to neglect their own equipment and pay for such repairs as are made at M. C. B. billing prices.

Is there not a basic inconsistency between Rule 1 and the

remainder of the interchange rules? Rule 1, by mandate attempts to place all cars, irrespective of ownership, on an equal basis so far as inspection and repairs are concerned. But it overlooks the fact that railroad corporations are essentially no different from and are subject to the same motives as individuals or corporations engaged in commercial or industrial pursuits, and that loyal officers and employees of these corporations are governed primarily by the immediate interests of their own organizations. The rules themselves imply a recognition of this fact since their purpose is largely to define and protect the rights of the car owner and the handling line respectively, the one from the other.

Is it reasonable to expect a high standard of freight car maintenance on a scale of standard billing prices low enough to discourage the handling line from carrying out the spirit of Rule 1 and at the same time, to encourage car owners whose costs are high to neglect their own equipment? A code of billing prices carefully established to avoid exceeding the average cost of labor and material and to which a percentage has only in recent years been added to cover legitimate items of overhead expense, necessarily must be applied at a loss by all roads whose costs are higher than the average and only those roads whose costs are lower than the average are offered any inducement other than a bare interest rate on the investment to provide facilities adequate properly to maintain all the cars on their lines.

Do these facts not suggest the desirability of establishing a scale of billing prices in which is included a reasonable profit in addition to all of the items of expense now taken into consideration?

The effect of such a scale of prices will be felt in several directions. In the first place, instead of being directly opposed, as they frequently are, the common interest of the roads to provide a high standard of public service and the individual interests of the roads would point in the same direction. The increased prices would tend to increase the extent and character of repairs to foreign cars. Just how extensive this improvement would be is open to some doubt, owing to the difficulty of securing promptly such material as must be furnished by the owner. The condition of many cars on their return to the home lines last fall, however, indicates that there is ample opportunity for improvement within the field requiring only such material as is commonly carried by all roads.

But the real responsibility for the maintenance of freight cars rests with the owner. With the suggested scale of prices the owner will be called upon to pay the repairing line a profit on a large part of the work done on foreign lines. And there would be a real incentive to provide for a high standard of heavy repairs to their own equipment to the end that frequent light repairs will be unnecessary. The wasteful results of continuing to operate the troublesome equipment of weak design would be brought home with an added force that would do much to hasten the complete rehabilitation or retirement of these cars. Eventually there would also be a marked improvement in the average standard of construction.

Considering the wasteful results of the patchwork methods of car maintenance, is it not reasonable to suppose that a high standard of maintenance would result in an actual reduction in the aggregate expenditure?



The question of standardization has received a great deal of attention for a decade by executive and operating officers as well as officers of the car department.

Standardization of Freight Cars

Several attempts to force the adoption of a complete standard box car design have been made, but so far without success. Considering the difficulties which have been encountered in the attempt to legislate cars with short draft arms out of service, the prospect for the adoption of a complete standard design does not look bright. Much good work has already been done by the Master Car Builders' Association and its successor, the Mechanical Division of the A. R. A. toward establishing limited dimensions for the strength and interchangeability of essential features of design. Such a standardization of details leaves little more to be desired, so far as interchangeability in interchange service is concerned. The limited extent of further requirements is evident from the fact that eliminating the repairs to draft gear attachments, and assuming an adequate maintenance program on the part of the owner, by far the largest part of the running repairs is confined to trucks, couplers and air brake equipment, the most affected details of which are already interchangeable.

In 1920 the total cost of maintaining over 94 per cent of the freight cars owned by all Class I railroads in the United States was \$626,746,636, an amount over \$17,000,000 larger than the total cost of locomotive maintenance on the same roads. Had the \$609,360,716 spent for locomotive maintenance been administered with the same lack of a definite program which characterizes the maintenance of freight

cars it is doubtful if 50 per cent of the locomotives in the country would now be fit for service. In order to maintain a high standard of serviceability and to secure a maximum of service for each dollar of maintenance expenditure, locomotives are scheduled for periodical classified repairs on a mileage basis. Cars operate under conditions which make impossible the same attention in service that locomotives receive. Is it not therefore a matter of even greater importance that they receive classified repairs at regular intervals, established after careful study of all the factors and strictly adhered to? With an established percentage of the equipment scheduled for classified repairs each year, programs for improvements needed to overcome weaknesses in design or to provide for changing operating conditions can be carried out before the continued failure and repeated patching accumulates an excessive but ineffectual maintenance expenditure.

The one thing most needed to improve car conditions is an adequate basis of fact concerning the service performance of each class of freight cars in relation to the cost of maintenance and the capital investment. With this as a foundation, design, maintenance and retirement policies can be established

Conclusion

with a high degree of assurance that the results will be reflected in better net earnings. But to put the subject in its proper light before executive and operating officers, as well as the officers of the mechanical department, and to provide the incentive most needed to make a high standard of maintenance equally attractive to the individual car owner and the railroads as a whole, the prices in the rules of interchange must both be put on a sound economic basis.

Speeding Up the Shop Production

Realizing that slack times should be used to get equipment in good shape for future needs, forward-looking railroad managers have reduced shop and enginehouse forces only under compulsion. Here is what one official has to say regarding this: "Railroads should be so financed by means of a cash reserve that when business is slack the equipment may be put in proper shape for the coming rush of business. The usual procedure is to let repairs lag in slack periods and then, as business picks up, attempt to make repairs when the equipment should be on the road earning revenue. A large number of men must be hired in a hurry, meaning inefficient help and high cost."

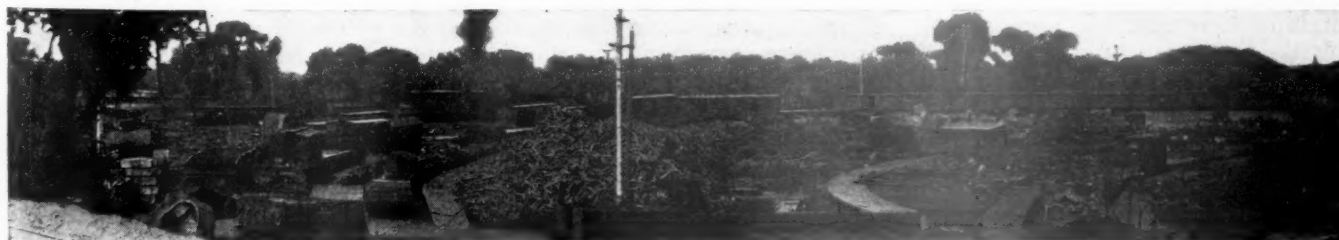
New shops and enginehouses are also needed in many

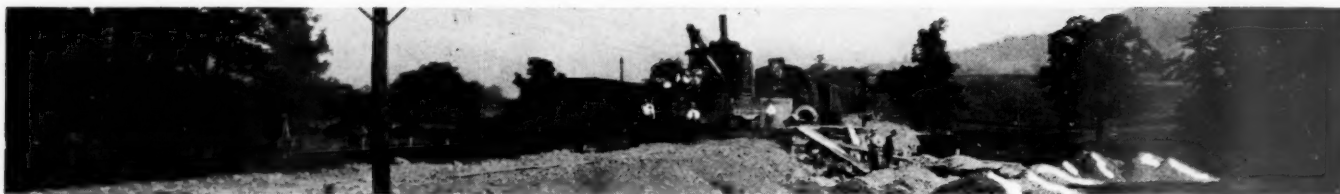
cases but few roads are in a financial position at present to supply this need and some alternative method of obtaining increased capacity and speeding up the work must be adopted.

Increased shop output at lower unit costs can be secured only by a careful analysis of the three component factors:

Three Factors In Shop Output

men, machinery and methods. Of these three factors, the first is most important. The importance of the human element can hardly be overestimated and unless it is taken into consideration, no attempt to improve shop output will be successful. Some roads are already benefiting by care in the





selection and training of employees and when the roads are allowed to pay employees in proportion to their efforts the results will be still more satisfactory. It is important that mutual understanding and confidence, based on fair dealings between management and men, be established to secure the best results. The community loses when square men are fitted in round holes. Wherever possible, men should be given work for which they are adapted and be promoted promptly as opportunity offers. After men, the other two factors, machinery and methods, are about equally important, efficient shop operation being impossible without either.

The modern tendency is to develop and utilize more and more efficient, powerful, labor-saving machinery. Railroad shops are no exception to the general rule and when new machines and devices are tried out, recommendations regarding them should not be lost sight of as is too often the case. That rail-

New Machinery Needed

road shop men understand the importance of keeping machine tools in good repair and replacing obsolete tools as fast as possible is shown by the analysis of railroad operating expenses recently published by the Bureau of Railway Economics, Washington, D. C. This analysis shows that for 1920 the amount of money spent by the railroads for shop machinery (Account 302) was \$4,596,016 greater than in 1919. Similarly the amount allowed for machinery depreciation, while far too small, was twice as much in 1920 as in 1919. Is "any machine that will run" good enough for a railroad shop? This old idea is fast being dissipated and the time will come, if it is not now here, when the same standards of economy and efficiency will be required of railroad shop machinery as of that used in industrial plants.

Second only to the need for improved, modern machinery is the necessity of utilizing present equipment more effectively. It has been pointed out

Utilize Old Equipment More Effectively

many times in the *Railway Age* that the output of many heavy repair shops is limited by the capacities of the respective machine departments and proper attention to these departments will show big results. Many old machines are too antiquated to be of value except for scrap but in many cases, desirable results can be secured by providing more powerful drives, increasing the speeds or speed ranges, or possibly strengthening the machines at weak points.

Competent repair gangs should be developed, charged with the duty of carefully and periodically inspecting all machines and keeping them keyed up for maximum production. In this way weak points in the machinery will be discovered and many breakdowns with their resultant delays prevented. It is important that the mistake should not be made of furnishing new machine tools and failing to supply the jigs and fixtures necessary for their efficient operation. Too much stress cannot be laid on the necessity for adequate, time-saving jigs and fixtures. A line should be drawn between efficient devices and those which cost more to make than they will ever save. The government valuation showed a great abundance of small tools of all sizes, kinds and conditions of usefulness. It is apparent that real economies can be effected by restricting the manufacture of these

tools to certain standards determined by experience to be most satisfactory.

One of the most important, if not the most important, method of increasing railroad shop output at small expense

Locomotive and Car Shop Schedules

is by the installation of shop schedule or routing systems, in charge of competent schedule men and supported by the managements. The idea is not to introduce complicated systems with a multiplicity of cards and forms to make out, but rather to apply the essential principles, allowing details to work themselves out as may seem desirable. The efficacy of shop scheduling has been amply demonstrated. Perhaps the most comprehensive description of what has been accomplished with shop schedules is included in the report of the Committee on Scheduling made at the meeting of the Mechanical Division, A. R. A., last year.

It is important that live schedule men be selected to direct the routing operations but it is most important that shop superintendents and general foremen appreciate the value of the system and determine to realize the maximum benefits from it. By lack of co-operation, an unconvinced general foreman can practically nullify the good effects of a shop schedule system. In doing this, he handicaps himself since the shop schedule will relieve him of an immense amount of detail, show just which department is lagging behind, and why, and so co-ordinate the work of all departments that the maximum number of locomotives, consistent with local conditions, will be turned out per month.

The economies that result from applying locomotive schedule systems can well be duplicated in handling car shop repair work (Railway Mechanical Engineer, June, 1921, page 349). This article shows that the same fundamental principles apply and there is no reason why they will not operate practically the same in both locomotive and car shops. As in locomotive repair work the principal object is to have the various car parts repaired in time to be assembled and the cars painted ready for service on a given date. It is not expected that the schedule would apply to light car repairs but only to heavy repair work.

The need of accurate and yet simple methods of computing shop costs is essential and perhaps not fully realized.

Accurate Knowledge of Shop Costs Essential

Without accurate knowledge of the cost of making a bolt in a certain way, it is impossible to tell whether the correct method is being used. Similarly, it is impossible to decide on the advisability of purchasing an expensive, specialized machine tool unless the relative costs of manufacture by the old and new methods are accurately known and the difference is large enough to pay interest and depreciation charges on the larger investment. Regulations of the Interstate Commerce Commission clearly define a system of railroad accounting, but details of shop costs are not required and without these there can be no effective control of shop costs. It is not maintained that an army of clerks should be employed to figure every detail, but enough details must be included to guide shop managements in securing the most economical operation. It is particularly important that cost accounts be figured as near as possible to the time when the charge is made and data should be available to predict in advance

what the cost of a new operation will be. This will avoid the expense of making new parts that can be more cheaply bought.

The tendency on progressive railroads at the present time is to establish centralized production shops for the manufacture of all standard small locomotive parts. The use of specialized automatic and semi-automatic machinery for the manufacture of many similar parts in these shops enables great economies to be made. As an example of what may be accomplished along this line an article published in the *Railway Mechanical Engineer*, June, 1917, page 289, will be of interest. The advantages of centralized production are numerous aside from the reduced cost of manufacturing each piece. In the first place finished, or semi-finished parts, in large number can be placed in stock in central storehouses, being furnished on order from any shop or roundhouse on the system. The final machine operations can be quickly performed on local machines and locomotives or cars returned to service in a minimum length of time. Moreover, the fact that small parts are standard and interchangeable is a valuable, time-saving feature. There is also little question that a closer inspection and better grade of material can be secured for all parts made in centralized production departments.

In connection with this it is important that reliable standards be developed for the entire road and more important still that these standards be lived up to. Standards based on good practices and made after thorough investigation can be enforced readily and should be arranged in a substantial systematic form so as to be placed in the hands of all concerned. In order that they may be readily enlarged and revised, a loose-leaf folio should be used.

Much can be accomplished by encouraging constructive criticism on the part of shop employees. Many of these men with long experience have valuable ideas if they can be brought out. A great deal of waste can be avoided by the more careful inspection of material used in the construction of locomotive and car parts. The material should be ordered on practical and conservative specifications and there is economy of maintenance and operation in purchasing material which is durable. During the war, both material and the quality of work were sacrificed in favor of output but this practice should now be corrected. When quality is sacrificed, the well-known final result is an excessive cost over the cost of doing a good job in the first place.

The installation of a modern flue welding plant in a certain shop enabled the flue welding organization to be reduced from nine employees to six with no reduction in output. In another instance, all brake pins for the entire system were manufactured on a forging machine, a practice which re-

leased a turret lathe for other work. In manufacturing cylinder and air pump packing rings, gang tools with six cutters each have been developed decreasing the cost of production 33 per cent. Main rods, side rods, eccentric rods and combination levers are now being manufactured interchangeable from right to left. This results in economy since it is not necessary to carry so many parts in stock. Application of an improved carriage to a driving wheel journal lathe has made it possible to turn and roll two journals at the same time, thus doubling the output. Reclamation plants upon a sound business basis will yield splendid returns.

The importance of grinding, particularly for finish operations on certain locomotive and car parts, should not be overlooked. In view of the success of some railroads with grinding, it is a little surprising to find that many others are not benefiting by this modern practice. Not only is greater accuracy and speed of production obtained but the finish of the work is superior. Ground bearings have demonstrated their superiority over turned and rolled bearings. It is generally conceded that piston rods, valve stems and guides, should be ground, but a great many railroads also grind crank pins, axles and journals. Still other railroads have had success in grinding chilled cast iron car wheels and car axle journals.

On account of the considerable distance between various departments and buildings of repair plants it is essential that some form of transportation system be provided for the movement of locomotive and car parts. In a certain case four industrial trucks were placed in service and are doing the work formerly handled by 20 employees with the usual hand trucks. In addition, the material is handled more promptly with a resultant increase in efficiency due to the material being on hand when needed. Second only to the scientific layout of shops and machinery is the need for wide, clear passageways and rugged, reliable, power-operated trucks. Hard smooth walks should connect all shops and buildings and all passageways should be kept clear. Otherwise the maximum advantages from the use of such trucks cannot be realized. While other forms of motive power may be used the electric storage battery truck, on account of its ease of operation, reliability and relatively low cost has won high favor. Not only has hand trucking been largely eliminated in certain shops but the trucks are scheduled to leave certain points at specified times, thus providing what may be called a shop transportation system. The advantages of this arrangement consist not only in moving material at a reduced labor cost but in increasing the actual production of individual departments. As soon as one operation on a machine part is completed the part is moved to the next machine, and the result is to speed up the production.

Centralized Production Departments

Machine Shop Practice

Grinding Locomotive and Car Parts

Shop Transportation Systems

Increasing the Engine Terminal Output

The tendency at the present time is to provide engine terminals equipped to handle heavy running repairs, thus accomplishing two important results. The time locomotives are held out of service is reduced to a minimum and, by reserving back shops for heavy repair work, shop schedules are more easily maintained and maximum output secured. It is important, however, to draw a line between repairs which can be economically made at roundhouses as now equipped and those repairs which should be made at back shops.

Draw Line Between Enginehouse and Back Shop

Simple, Rugged Machine Tools Are Needed

One motive power superintendent, commenting on the increased size and weight of locomotive parts, explains that many terminals are required to meet conditions and follow practices which answered the purpose ten years ago but are now extremely expensive and unsatisfactory. Enginehouse forces should be organized and equipment provided to maintain locomotives at a high degree of efficiency between shoppings for classified repairs. It is important to install the right kind of machine tools in roundhouses and the old practice of

shipping obsolete, wornout tools from back shops is expensive and in many cases unwarranted. The cost of a machinist's time is just as great in a roundhouse as in a back shop, and usually the work is wanted in a greater hurry. Why handicap the roundhouse? The installation of simple, rugged machine tools will pay an ample return on the investment.

Perhaps the greatest possibility of economy in operating many locomotive terminals is in providing improved coal and ash handling facilities. The high cost of labor makes it essential to install as much labor saving machinery as is consistent with the size of the terminal. In addition to reducing labor costs, the installation of modern coal and ash handling equipment will facilitate turning locomotives and increase locomotive revenue earning hours.

Coal and Ash Handling Equipment

While overhead electric traveling cranes have been installed in roundhouses this involves practically rebuilding the roundhouse structure and the expense is in many cases prohibitive. For new terminal developments and where it is planned to do a large proportion of the heavy running repairs, however, there can be little doubt of the need for electric overhead traveling cranes. In the average roundhouse, there are big possibilities of improvement by installing monorail electric hoists, jib cranes and portable cranes. These will facilitate removing and handling heavy locomotive parts which must be renewed. As in the case of railroad shops, terminals also should be provided with power-operated trucks and hard smooth passageways in order that materials may be moved from place to place readily. While the two-wheel hand truck still has its use, all long hauls of heavy material should be made by power trucks, or if the size of the terminal does not warrant this refinement, four-wheel trucks with ball bearing wheels of large diameter should be used.

The need of auxiliary drop pits for engine truck and tender wheels is acknowledged by a large majority of railroad men. The advantages of these pits are mainly reduced labor costs and a considerable saving due to returning the locomotive to service more quickly than would be the case if it had to be jacked up at the front end to remove defective truck wheels. If the front tender wheels are defective, a drop pit also saves cutting the engine-tender connections, including the automatic stoker connections when the locomotive is stoker equipped.

It is exceedingly important in roundhouse work to make sure that inspectors and repair men know definitely just what part of the work is assigned to each, no chance of shifting responsibility being allowed. Good results have been accomplished by posting work reports but it is not alone necessary to post these reports on the boards. Each man should be given a slip for the work he is supposed to do, otherwise he will almost invariably pick the easiest work and leave the more important items to the last, often delaying locomotives.

A considerable saving can be effected in the case of loco-

motives requiring but minor repairs by having these repairs made without putting the locomotives over the turntable. The provision of a covered inspection shed with a few repair men to perform the little jobs as soon as discovered by inspectors will thus greatly increase the number of locomotives that can be turned at a given point. Each district boiler inspector should make the same kind of inspection as a government inspector and his report be observed as seriously. Experience has demonstrated that it will pay to have a man on the personal staff of the superintendent of motive power to do nothing else but look after boiler washings, the cost of boiler maintenance being largely dependent on careful, periodical boiler washing with hot water. Hot water washing and refilling systems should be installed in roundhouses with pipes extending to each pit.

The development of careful, reliable men periodically to inspect and pack journal boxes is essential. On one road an expert in valve setting was also assigned to the superintendent's staff and was responsible for saving large amounts of fuel monthly due to the more careful squaring of valves and adjusting of cut-offs.

A timely article on modern roundhouse needs and operation is published in the *Railway Mechanical Engineer*, June, 1921, page 337. It points out among other things the need for careful inspection and prompt repair of all locomotive defects. The time to cure engine failures is before and not after they occur. The possibilities of altering track layouts at small expense and with important savings in the time required to turn locomotives are mentioned. It is also recommended to provide emergency outlets around single controlling switch points in case of derailment at these points. The most important point developed in the article is the need of capable, efficient roundhouse forces, able and willing to co-operate with each other and with the transportation departments. The need of reasonable hours, good working conditions and adequate compensation, to attract men of the necessary calibre, was strongly emphasized.

Mechanical department officers of both shops and engine-houses should be keenly alert for possible improvements either in machinery or methods, and accompany all recommendations with a full and complete statement of details. Recommendations should be based on facts. To quote another superintendent of motive power, "I have frequently found, both when making or passing upon recommendations, that a full, complete statement setting forth the existing facts, also covering several different remedies and selecting the one which accomplishes the greatest good at the least expense, is usually acted upon quickly and favorably if the funds are at all available. A vague recommendation without supporting facts, on the contrary, causes the officer passing upon it immediately to start some investigating on his own account to see whether he can figure out a cheaper way to do it. Perhaps the case appears so weak that he does not think it entitled to further consideration and sometimes it is put so vaguely that he does not have time to study it out."

The Roundhouse Up-To-Date

Recommendations Based on Facts



Progress of Missouri, Kansas & Texas Since 1913

Increased Capital and Maintenance Expenditures Under Receivership Have Enabled Great Improvement in Operating Results

Part I.

By Samuel O. Dunn
Editor of the *Railway Age*

THE MISSOURI, KANSAS & TEXAS RAILWAY LINES passed under the present management when C. E. Schaff became president in April, 1912. The railway was then a typical southwestern granger road in physical condition and in traffic. It was built with grades conforming to the general surface of the territory served, with narrow banks and cuts and rails of light section and varying weights; and these general conditions still prevailed. Its tracks and bridges were not strong enough to accommodate locomotives of modern size and weights. Most of its engines were light and of old designs, and it lacked good engine terminals and shops for handling and maintaining its power. These things rendered it impracticable to move freight in large train loads and with economy.

Various parts of the property had been built at different times by construction companies largely for speculative purposes. It had been loaded with heavy fixed charges upon an indebtedness taking a wide variety of forms. Its high operating costs and fixed charges had rendered it impracticable to raise the new capital required to make the permanent improvements without which needed operating economies could not be effected.

In 1906 the company had begun to pay small dividends upon its preferred stock. To meet the heavy fixed charges and these dividends, maintenance expenditures were unduly restricted. The total paid in dividends between 1906 and 1914, when they were discontinued, was \$4,420,000. This involved the disbursement of money which should have been spent on the property.

The years 1914 and 1915 were a period of reduced traffic and poor earnings for all the railways of the United States, including those of the southwest. The new management of the Missouri, Kansas and Texas, in addition to discontinuing the dividends on the preferred stock, effected some reduction in operating expenses, especially in transportation expenses. But the condition of the property rendered impracticable as large reductions of expenses as were needed to make a satisfactory financial showing.

In 1915 there came due \$19,000,000 of 5 per cent two year notes. Part of the holders refused to consent to an extension for one year at 6 per cent. In consequence, on September 27, 1915, the Missouri, Kansas & Texas Railway Company and the Missouri, Kansas & Texas Railway Company of Texas passed into receivership, Mr. Schaff being appointed receiver.

In this same period railways having most of the mileage in the southwest became insolvent. This was due very largely to the policy of state regulation to which they were subjected. The southwestern states fixed freight and passenger rates so low that even under good and economical management most of the railways could not make enough net earnings to meet their fixed charges when business was poor.

Immediately after Mr. Schaff took charge of the Missouri, Kansas & Texas in 1912 the formulation of plans for needed improvements was begun, but until the receivership it was impossible to make progress in carrying them out. The receivership removed the necessity of meeting all fixed charges

and made it possible to begin carrying out a real improvement program.

The change in policy was reflected immediately in a large increase of expenditures for maintenance. Before 1916 these expenditures had not in any year exceeded \$10,000,000. In 1916 total expenditures for maintenance were increased to \$14,909,499, or over 50 per cent, and a liberal maintenance program has been continued since. The expenditures chargeable to capital account made under the receivership from September 27, 1915, to December 31, 1920, were \$25,556,283. The interest not paid was almost the same, being \$24,000,000. Of the total expenditures chargeable to capital account \$11,109,965 were chargeable to equipment and \$14,446,318 to roadway and to other permanent structures.

Capital expenditures on a railroad have one or both of two purposes—to enable it to render more and better service, or to handle its traffic at a lower operating cost. If the new investment makes it possible to reduce operating expenses more than it increases interest it yields a net profit. But that new investment may reduce expenses more than it increases overhead charges a proper balance must be maintained between the various improvements made. The mistake has been made on not a few railroads within recent years of acquiring heavier and more powerful locomotives faster than other facilities have been provided to make it possible to secure the greatest practicable service from them. The problem of maintaining the most efficient relationship between increases of the various kinds of facilities is a very difficult one, but only by correctly solving it can a management derive the greatest practicable benefits in increased operating efficiency from any given additional investment.

The entire program originally outlined for making the Missouri, Kansas & Texas a modern railroad in physical facilities and operating and financial results has not yet been carried out. The progress thus far made, however, as evidenced by the manifest improvement of the physical property and of the operating and financial results, has been so great as to afford the best testimony that the general plan of improvements is adapted to the special conditions and needs of the railroad, and when fully carried out will enable the road to produce operating and financial results which will compare favorably with those of other railways having similar conditions.

Improvements in Track and Permanent Structures

The density of traffic on different parts of the M. K. & T. system varies widely. Between Muskogee, Oklahoma, and Denison, Texas, 157 miles, the densest and best balanced traffic on the system is handled. The total freight on this part of the line is almost twice that on the line between St. Louis and Sedalia or on that between Kansas City and Parsons, and almost three times that on any of the lines in Texas below Denison. Indeed, except between Sedalia and Parsons, 159 miles, between Parsons and Muskogee, 117 miles, and especially between Muskogee and Denison, 157 miles, the freight traffic is still so light that it can easily

be handled on a well equipped single track railroad line.

The following table summarizes the expenditures on roadway, track and other permanent structures chargeable to capital account made under the receivership to December 31, 1920:

Class	Improvement to roadway and structures chargeable to Cap. Account
Road—	
Widen cut and fills, etc.....	\$1,102,295
Ballasting.....	691,270
Rails and other track material.....	1,260,817
Bridges, trestles and culverts.....	1,217,462
Elimination grade crossings.....	235,663
Grade crossing and crossing signals.....	422,107
Additional main tracks.....	
Additional yard tracks, sidings and industry tracks.....	2,945,300
Change of grade or alignment.....	129,623
Signals and interlocking plants.....	593,614
Telegraph and telephone lines.....	204,325
Roadway machinery and tools.....	145,025
Section houses and other roadway buildings.....	416,868
Fences, etc.....	48,089
Freight and passenger stations, office buildings and other facilities.....	441,500
Hotels and restaurants.....	
Fuel stations and appurtenances.....	609,693
Water stations and appurtenances.....	439,610
Shop buildings, engine houses and other appurtenances.....	819,692
Shop machinery and tools.....	332,539
Grain elevators and storage warehouses.....	120
Real estate.....	39,332
Assessment for public improvement.....	16,529
Terminals and other large projects.....	1,615,424
All other improvements.....	719,421
	\$14,446,318
Extension branches and other new lines.....	
Total road.....	\$14,446,318

The total mileage operated is now 3,558 miles. Of this, 1,197 miles have been improved and strengthened by widening banks and cuts, 355 miles have been newly ballasted and 970 miles have been reballasted. Before the improvements under the receivership the railway had practically nothing but dirt ballast, and heavy rains and high water frequently resulted in tracks being washed out or sinking into the mud until operation over them became unsafe, if not impracticable. The cost of maintenance of way as well as of transportation was unfavorably affected by these conditions. The remedy was the construction of a more permanent roadway, and the situation in this respect has been greatly improved. Large parts of the railroad are now well ballasted, this being especially true from Sedalia to Parsons and more particularly from Parsons to Denison. The company has quarries and rock crushers at three convenient points where a good quality of rock ballast is obtained. There is a large mileage ballasted with chatts, a considerable mileage with burned clay and some with shell.

The average weight per yard of rail in track on the whole system on December 31, 1912, was 67.56 pounds. As this figure indicates, there was a great deal of very light rail. The average weight of rail on September 30, 1920, was 73.85. New 90-pound rail has been laid on 384 miles and new 85-pound rail on 361 miles; and 260 miles of 85-pound rail, 13 miles of 75-pound and 144 miles of 66-pound second hand rail have been relaid to replace lighter rail, making a total of 1,162 miles on which the rail has been improved. Formerly only a small part of the track was equipped with tie plates. Under the receivership 933,232 tie plates have been applied.

When the present management took charge the bridges were not strong enough to carry heavy locomotives. There have been erected 6,208 linear feet of new steel bridges; and 2,096 linear feet of second hand steel bridges have been erected to replace light spans and trestle bridges. Almost 33,000 linear feet of trestle bridges have been replaced with permanent structures, and 40,087 linear feet of trestle bridges have been strengthened by the application of additional stringers.

There have been acquired 386 motor cars to replace hand cars used in track maintenance work. Important line revisions and grade changes have been made at 11 different

places. Safety in operation as well as expedition in handling traffic have been promoted by the installation of 176 miles of automatic block signals. Numerous new station buildings have been constructed and others enlarged. Many improvements have been made to enable the railway to better maintain and utilize its locomotive power. Six mechanical coaling stations have been constructed and a coal pulverizing plant established at Parsons shops. Oil is now used almost exclusively for fuel on the Texas lines, and fuel oil stations have been provided at all terminals in Texas, including storage facilities, with a total capacity of 750,000 barrels. The water supply of the entire system has been improved by new reservoirs, wells, treating plants and modern pumping stations.

When the present management took charge the Missouri, Kansas & Texas, like many other single track railways, needed a large expansion of its terminals to enable it satisfactorily to handle the traffic it already had and to provide for the steady increase of traffic which was occurring, and the terminals have been enlarged at most important points.

In most respects the most important point on the system is Parsons, Kansas. Here the lines converge from St. Louis, Kansas City and Junction City, Kansas, on the north; and from here runs the branch to Joplin, Missouri, and also the main line southward to Oklahoma City and to Denison. Here are located the principal locomotive repair shops and large classification yards. The freight terminal yard here was extended in 1917 and 1918 by the construction of 27.97 miles of additional track, including three miles of second freight main track approaching the terminal. The standing capacity of the yard was increased from 1,068 to 3,498 cars. As rearranged the yard contains 16 tracks of capacity from 106 to 119 cars, and 32 classification and hold tracks of from 24 to 78 cars capacity. A 32 stall brick roundhouse was extended 15 feet to a depth of 100 feet and seven additional 100-ft. stalls were constructed. The old 50,000 gallon wood water tub was replaced by a 150,000 gallon steel tank on a steel tower. Inadequate boiler washing facilities were replaced by a modern plant of large capacity.

One of the most complete and modern reclamation plants in the country provides excellent facilities for reworking second hand and scrap materials, and adjacent to it is storage space for bridge and building lumber and track and switch material. It has been estimated that during the period when prices of materials and supplies have been so high this reclamation plant has enabled the railway, by reworking old materials, to effect savings averaging around \$50,000 a month. It is always difficult accurately to estimate savings made by reclamation work, largely because of the practical impossibility of assigning to it proper overhead charges; but there can be no doubt that the reclamation plant of this railway has been developed and managed along right lines and has effected large savings.

Other points at which important improvements in terminal facilities have been made are New Franklin and Lindale, Missouri; Muskogee, Osage and McAlester, Okla., and Dallas, De Leon and Wichita Falls, Tex. At Oklahoma City, Oklahoma, complete new locomotive and car facilities are now under construction to replace facilities which had been outgrown.

At San Antonio, Texas, a new belt line was constructed in 1916 and 1917 which is $7\frac{1}{4}$ miles long from the point of the old connection with the Southern Pacific tracks near Fort Sam Houston to the new passenger and freight terminals at South Flores and Durango streets. The work here included the construction of a crossing under the Southern Pacific main track, seven concrete crossings under streets, and eight concrete and one timber crossing over streets. The new passenger station erected here is built of tile and concrete and is one of the most commodious and architecturally

attractive stations in the southwest. It is served by four passenger tracks.

As already indicated, Denison, Texas, is one of the most important points on the system, and here extensive terminal improvements of all kinds are needed and projected. The yard and engine facilities are especially inadequate. It is planned to enlarge the yards at an expenditure of about \$2,000,000, and to build a new modern roundhouse to cost about \$1,000,000. The locomotive repair shop here is to be converted into a central car repair plant for the entire system, and the locomotive shop at Parsons is to be very substantially enlarged to care for the locomotives.

Improvements in Equipment

The expenditures for equipment chargeable to capital account which have been made under the receivership have been as follows:

Class	Expenditures for equipment chargeable to Cap. Account
Locomotives, steam	\$4,356,179
Freight train cars	4,079,986
Passenger train cars	498,578
Work equipment	711,651
Miscellaneous equipment	13,927
Improvements to existing equipment	1,449,644
Total equipment	\$11,109,965

Improvements in Locomotive Equipment

Undoubtedly the most significant and important improvement the Missouri, Kansas & Texas has made in its equipment is in its freight locomotives. Table 1 shows the class, number and tractive power of the freight locomotives in service on June 30, 1912, and December 31, 1920.

It will be noted that the largest freight locomotives the road had when the present management took charge were Consolidateds with an average tractive power of 36,313 pounds. At present it has 150 Mikados with an average

the policy of the management to change as rapidly as conditions would permit from the use of the Atlantic to the Pacific type of locomotive for through passenger service. Passenger service to the southwest is quite highly competitive, and improvements in its passenger locomotives were required to enable the Missouri, Kansas & Texas to hold its own in this competition.

During this period the receiver bought 3,500 new freight cars, 410 ballast cars and 300 oil tank cars. Of the new freight cars 1,500 were coal cars (gondolas), 1,000 box cars and 1,000 combination coal and stock cars. A large amount of obsolete car equipment was retired and in consequence there was an actual decline from 24,804 to 21,483, or almost 14 per cent, in the total number of freight cars. The average capacity per car increased about 11 per cent, however, resulting in a total decrease in revenue freight car capacity of less than 4 per cent.

The receiver evidently reasoned that the traffic the road could handle and the economy of handling would be increased more by improving and adding to its locomotives than by improving and increasing the amount of its freight car equipment.

Increase in the road's freight traffic has, however, been so much greater than the increase in the total capacity of its cars as to indicate that it seriously needs more freight cars. An additional evidence of this is afforded by its figures regarding hire of equipment. Within recent years it has been paying out increasingly large amounts for hire of freight cars. Its debit balance on this account in 1918 was \$585,000 and in 1919 was \$841,400. In the last four months of 1920 alone it was \$452,452. These figures probably represent a complete, if not more than complete, offset to the savings in fixed charges and maintenance of equipment costs that have been made by not buying more freight cars.

While there has been a decline in the number of freight

TABLE 1
NUMBER AND CAPACITY OF FREIGHT LOCOMOTIVES, DECEMBER 31, 1920, COMPARED WITH JUNE, 1912

Class	Number, 1920	Number, 1912	Increase, 1920 over 1912		Average tractive power, pounds		Increase av. tr. power	Per cent
			Number	Per cent	1920, lbs.	1912, lbs.		
Mikado	150	...	150	...	57,671	...	57,671	...
Consolidated	51	66	15*	22.7*	36,293	36,313	20*	.055*
Mogul, 60 ton or over	109	222	113*	50.9*	30,077	28,619	1,458	5.09
Mogul, under 60 ton	60	50	10	20.0	24,098	20,804	3,294	15.83
Totals	370	338	32	9.46	41,151	28,966	12,185	42.07
Total tractive power, all freight locomotives, 1912					9,790,508 lbs.			
Total tractive power, all freight locomotives, 1920					15,225,870			
Total increase tractive power, 1920 over 1912					5,435,362			
Percentage of increase in total tractive power					55.5 per cent			

*Indicates decrease.

tractive power of 57,671 pounds. These locomotives are especially well adapted to the character of freight service that must be rendered on the main lines of heavy traffic. While they are very efficient on its main lines at present, they could not have been efficiently used without the strengthening of bridges and tracks which has been described above. The average weight on drivers of the road's old Consolidated engines was only 85.3 tons, while the average weight on drivers of the Mikados is 112.4 tons. With the bridges and tracks in the condition they were when the present management took charge the operation of these heavy engines on many of the lines where they are now used would have been impracticable.

While there has been an increase of but 9.5 per cent in the number of the railway's freight locomotives, the increase in their combined tractive power has been 55.5 per cent.

The number of switch engines has been increased from 127 to 178, and their average tractive power from 24,709 pounds to 32,490 pounds. The number of passenger locomotives has been increased from 163 to 180, and it has been

cars, an energetic policy of maintenance and improvement of old equipment has been pursued. At the end of the year only about 4 per cent of the road's freight cars were in bad order, as compared with almost 8 per cent for the railways of the country as a whole.

In 1912 the Missouri, Kansas & Texas had 459 passenger train cars, and in 1920 only 442. The principal decline was in the number of coaches. The receiver has bought 67 new passenger cars, the decline in the total number being due to the retirement of obsolete equipment.

General Condition of the Property

Both study of the data regarding the program of improvements which has been carried out, and the writer's own inspection of all the principal lines, show that the property's general physical condition has been greatly improved. This improvement has been mainly due to the expenditures chargeable to capital account which have been mentioned, but also largely to a generous policy of maintenance. The railway's main line from Sedalia, Missouri, to Denison,

Texas, and especially from Parsons, Kansas, to Denison, on which the heaviest business, both passenger and freight, is handled, is in such fine condition that heavy through passenger trains can be run over it in comfort and safety at speeds as high as 70 miles an hour. The various branch lines have not, of course, been improved anywhere near so much, but the improvement in many of them has been substantial.

A Word About the Organization

No matter in how good condition physically a railway is, good results cannot be obtained in its operation without a good organization. Whatever the precise form of organization adopted, its efficiency depends mainly upon its personnel and upon whether there is friction or close co-operation between the different departments. It is decidedly true that Mr. Schaff has succeeded in building up an excellent organization, and even the parceling out of the system under two federal managers under government control produced no effects upon the organization which have very seriously affected its working since the railway was returned to private operation. The successful everyday operation of a railway requires that the operating organization shall be composed chiefly of men still in the prime of life and having not only the initiative and ready resourcefulness, but also the physical endurance, which most men necessarily begin to lose after

Operating Results

The real, ultimate test of the wisdom of any policy of railway development, improvement and operation is the operating and financial results secured. Table 2 gives freight traffic and operating statistics.

It will be seen that the total number of tons of revenue freight carried one mile during the year 1920 was 79.1 per cent greater than in 1913. Including company freight, the increase in ton miles was 73.9 per cent. The increase in the density of revenue freight traffic—that is, tons carried one mile per mile of road—was from 484,573 to 873,342, or 80.2 per cent. Including company freight, the increase in traffic density was 74.9 per cent.

The average tons of revenue freight per train in 1913 was 254.83 and in 1920, 441.93, an increase of 73.4 per cent. The increase in average tons per train, including company freight, was from 299.40 to 504.00, or 68.3 per cent. The increase in the average revenue freight train load of the railways of the United States as a whole in the same period was 46 per cent. The average gross tons per freight train mile on the Missouri, Kansas & Texas increased from 783.66 to 1206.26, or 53.9 per cent. Because of the relatively very large increase in its average freight train load, the Missouri, Kansas & Texas in 1920 rendered 79.1 per cent more revenue freight service than in 1913 with an increase of only 3 per

TABLE 2
FREIGHT TRAFFIC AND OPERATING STATISTICS, PERIOD 12 MONTHS ENDING DECEMBER 31, 1920, COMPARED WITH SAME PERIOD, 1917 AND 1913

	12 months, 1920	12 months, 1917	Increase or decrease	Per cent	12 months, 1913	Increase or decrease	Per cent
Average mileage operated.....	3,793.42	3,866.31	72.89*	1.9*	3,816.77	23.35*	0.6*
Tons carried, revenue freight.....	13,352,467	12,864,973	487,494	3.8	9,088,565	4,263,902	46.9
Tons carried one mile, revenue freight.....	3,312,953,098	2,986,315,848	326,637,250	10.9	1,849,503,484	1,463,449,614	79.1
Tons carried one mile, including company freight.....	3,778,300,096	3,457,898,682	320,401,414	9.3	2,172,945,329	1,605,354,767	73.9
Tons carried one mile per mile of road revenue freight.....	873,342	772,394	100,948	13.1	484,573	388,769	80.2
Tons carried one mile per mile of road, including company freight.....	996,014	894,367	101,647	11.4	569,315	426,699	74.9
Tons per train, revenue freight.....	441.93	428.01	13.92	3.3	254.83	187.10	73.4
Tons per train, including company freight.....	504.00	495.60	8.40	1.7	293.71	204.48	69.6
Tons per loaded car, including company freight.....	24.35	22.03	2.32	10.5	17.28	7.07	40.9
Tons per locomotive, revenue freight.....	436.83	427.58	9.25	2.2	250.00	186.83	74.7
Tons per locomotive, including company freight.....	498.19	495.10	3.09	.6	293.71	204.48	69.6
Average miles each revenue ton carried.....	448.12	428.13	20.00	4.5	203.50	44.62	21.9
Gross ton miles per freight train mile (including mixed).....	1,206.26	1,154.33	51.93	4.5	783.66	422.60	53.9
Miles run by freight and mixed trains.....	7,496,573	6,977,194	519,379	7.4	7,257,710	238,863	3.3
Miles run by revenue freight locomotives.....	7,584,094	6,984,302	599,792	8.6	7,398,156	185,938	2.5
Freight car mileage.....	261,570,308	238,822,604	22,747,704	9.5	194,503,127	67,067,181	34.5
Loaded car mileage.....	155,177,603	156,933,687	1,756,084*	1.1*	125,737,447	29,440,156	23.4
Per cent loaded car mileage to total car mileage.....	59.33	65.71	6.38*	9.7*	64.65	5.32*	8.2*
Empty car mileage.....	98,905,166	74,975,170	23,929,996	31.9	61,662,461	37,242,705	60.4
Per cent of empty car mileage.....	37.81	31.39	6.42	20.5	31.70	6.11	19.3
Total cars per freight train (exclusive of caboose).....	33.89	33.24	.65	2.0	25.82	8.07	31.3
Loaded cars per freight train.....	20.70	22.49	1.79*	8.0*	17.32	3.38	19.5
Empty cars per freight train.....	13.19	10.75	2.44	22.7	8.50	4.69	55.2
Average number loaded cars per train, north and east.....	20.25	22.30	2.05*	9.2*	15.79	4.46	28.2
Average number empty cars per train, north and east.....	13.49	10.25	3.23	31.5	9.66	3.83	39.6
Average number loaded cars per train, south and west.....	21.16	22.69	1.53*	6.7*	18.89	2.27	12.0
Average number empty cars per train, south and west.....	12.89	11.24	1.65	14.7	7.31	5.58	76.3
Pounds fuel per 1,000 g.t.m. freight (excluding switch).....	203.66	217.74	14.08*	6.5*	274.08	70.42*	25.7*
Average miles per freight car per day.....	23.23	24.96	1.73*	6.9*	21.85	1.38	6.3

*Indicates decrease.

passing middle life. The Missouri, Kansas & Texas has in the important positions in its transportation, mechanical and engineering and maintenance of way departments an unusual number of men who are still young and full of energy and initiative. There is good feeling and close co-operation between the different branches of the operating department.

The relations between the management and the employees also are unusually good. The management recently inaugurated the policy of inviting the chairmen of the grievance committees of the labor organizations to participate in staff meetings and serve on efficiency committees of various kinds with the officers and to bring before these committees and the staff meetings all the suggestions for improvements in operating methods and service that may occur to them or that may be made to them by other employees. This policy has been received in a cordial and helpful spirit by the representatives of the employees, and will, it is believed, not only serve directly to increase efficiency of operation, but also to increase it indirectly by establishing and maintaining more harmonious relations between the railway and its men.

cent in the mileage run by freight and mixed trains, and an increase of only 2.5 per cent in total miles run by freight locomotives.

It should hardly be necessary to say that this greatly increased efficiency and economy in handling freight was due not only to improvements in locomotives and operating methods, but also to improvements in tracks and other facilities. Without the improvements in tracks, yards and other terminal facilities, it would have been impossible to have utilized the locomotives with so much greater efficiency.

The second part of this article about the progress of the M., K. & T. will be published in our next issue.

400 MILES WITH ONE LOCOMOTIVE.—The Missouri, Kansas & Texas, of Texas, is operating passenger trains between Denison and San Antonio, a distance of 400 miles, without changing locomotives. There are eighty daily trains on this line. The locomotives are of the Pacific type, using oil as fuel, and practically all the engines are making 400 miles a day. This arrangement has been in effect over a year and has been very successful.



New Car Repair Shop of the Chicago, Indianapolis & Louisville at Lafayette, Ind.

C. I. & L. Builds Modern Car Repair Shop

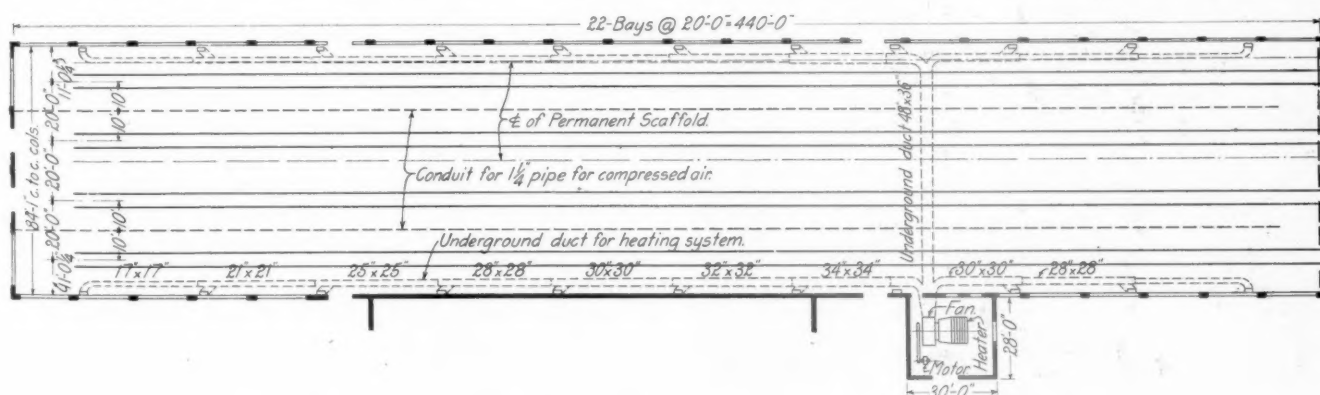
Installation at Lafayette, Ind., Will Greatly Facilitate Rip Track Performance

ON DECEMBER 3, 1920, the Chicago, Indianapolis & Louisville undertook the construction of a large car repair shop and a jacking stall at Lafayette, Ind., the latter for use in straightening steel cars. In less than four months the car repair shop was completed and placed in operation. It is a steel frame structure of the longitudinal type, 440 ft. long, 85 ft. wide, and 40 ft. high, with brick curtain walls and steel sash, transverse monitor roof construction and a concrete floor. It contains four tracks having an

this construction the facilities at Lafayette for repairing cars consisted only of a series of unprotected tracks on cinders.

The Shop Has Well Lighted Interior

The car repair shop as completed joins the paint shop which was already in existence and occupies the site which had previously been utilized for car repairing purposes in the open. A special feature of the building, is the abundance and distribution of the light, the walls, the roof, the interior



Floor Plan of Chicago, Indianapolis & Louisville Car Repair Shop at Lafayette

aggregate capacity for 32 cars, all served by an overhead crane. The total expenditure for the improvement is approximately \$200,000.

This building is an excellent example of modern practice in car repair facilities. Providing as it does complete protection from unfavorable weather, built of walls almost entirely of glass, having a solid, dry and level working floor, affording wide aisles between cars and spacious headroom, and equipped with heating facilities, electric floor trucks and an overhead crane, it stands as an evidence of the increasing realization among railroad officers that it pays to promote the health, comfort and convenience of workmen. Prior to

clearances and even the concrete floor, contributing in producing this effect.

The walls themselves are practically 80 per cent glass. Constructed in bays of 20 ft., of which there are 22 in each side and four in each end of the building, the use of brick is confined to the pilasters and to three narrow horizontal courses, one across the top of the bay, a second across the bottom and a third midway between, the latter serving to obscure the I-beam and crane rail inside the building as well as to assist in bracing the building. The remaining area of each bay is occupied by windows, these windows being 17 ft. wide and 17 ft. high and occurring two in a bay, one above

the other, excepting in every fourth side wall which, being lower by about seven feet than the other three (in order to accommodate the transverse monitor design of the roof) have but one and one-half windows. Each window is composed of 14-in. by 20 in. Truscon glazed glass framed in steel and for the purpose of strength is reinforced by a narrow horizontal steel mullion and by vertical sag rods.

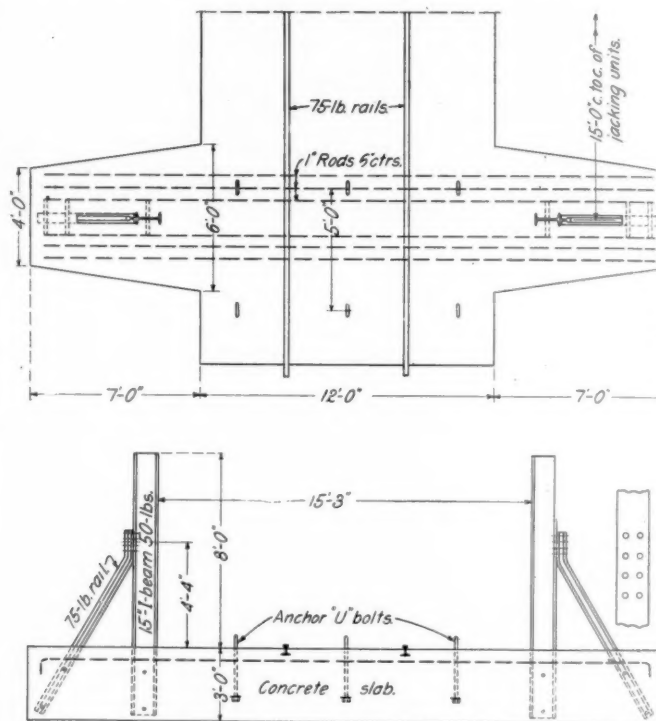
The degree to which the roof contributes in producing the general lighting effect may be appreciated when it is considered that it is supported 40 ft. above the floor on steel trusses which in themselves offer practically no obstruction to light. Also roof monitors 60 ft. wide and about 7 ft. high extend entirely across the building above three of every four wall bays, in the sides of which are window sash 5 ft. high and practically 80 ft. long.

The four tracks enter the building at one end, each through a separate door. They are imbedded in the concrete floor and extend through the house on 20 ft. centers to within 20 ft. of the rear end where an area 20 ft. wide and 85 ft. long is reserved for various machine tools and the supply racks. Spaced as these tracks are on 20 ft. centers with no columns between (the roof, as mentioned, being supported on trusses), an areaway is provided on either side which is ample for the free movement of electric trucks, which are employed throughout the building, as well as the convenient performance of all car repairing work. The widths of these aisles is also such

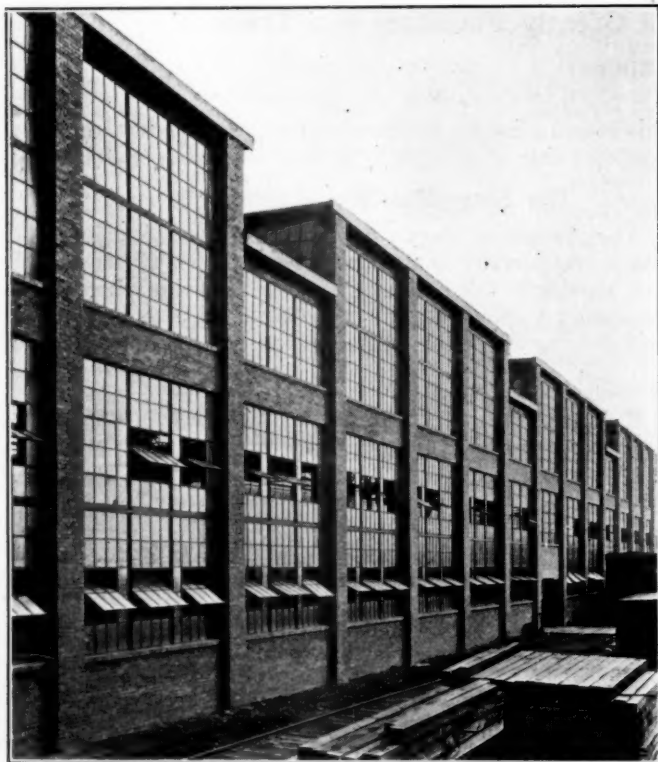
lengthwise, it provides a means of handling material quickly and conveniently without interfering with work in progress on the floor.

Another feature of the construction is a permanent system of scaffolding erected through one-half of the house. This consists of a row of columns along each side of two of the four tracks, the columns occurring at intervals of 18 ft. along the aisles and together comprising a system designed to facilitate work on the sides of cars, it being the plan to consign all cars requiring such repairs to these tracks.

Access to the shop is had by the four main doorways and



Partial Plan and Elevation of Jacking Stall



Exterior View of Car Repair Shop

as to contribute materially to the effective distribution of the light.

The Shop Is Served by an Overhead Crane

Unusual in car repair shop design and therefore standing out prominently as a feature of the construction is the traveling crane which serves these tracks. This crane, of Bedford make, spans the entire width of the shop 25 ft. above the floor, being supported on crane rails along the side walls of the building. It is operated from a self-contained cab. Equipped as it is with a 20-ton hoist and a 5-ton auxiliary, and capable of moving under its own power either across the shop or

six side entrances, two doors being provided in each side wall and two in the rear. Both car doors and side doors are of the wooden swinging type, the side doors being 8 ft. wide and high, equipped with window sash, while the car doors are all wood in steel frames 14 ft. wide and 17 ft. high.

Air for operating pneumatic tools and for testing purposes is obtainable at valves in the floor between each side wall and its nearest track, there being valves every 50 ft. along a 1 1/4-in. pipe carried in a plank-covered conduit in the concrete floor.

Ventilation is provided by large and numerous sections of pivoted sash in the wall and monitor windows. Provision is made for heating the shop by a hot air system, whereby air is passed around steam coils and forced by a No. 11 "Si-rocco" fan operated by a 30 hp. electric motor, into hot air ducts which extend along the shop walls below the concrete floor and distribute the air through radiators at intervals of 40 ft. along the wall. Artificial light is provided by electric drop lights extending through the building above the aisles at intervals of 40 ft., auxiliary to which are plugs in the walls for attaching portable lights.

The floor consists of five inches of concrete reinforced with No. 9 woven wire and laid on gravel. The tracks are imbedded in this concrete and depend for their support on cross ties below the floor. The roof consists of 1 3/4 in. tongued and grooved yellow pine sheathing covered by a 4-ply Carey built-up roof and laid directly on steel channel purlins spaced on 7-ft. centers. The roof rests directly on the top chords of the trusses in all cases excepting between

monitors, where the purlins are attached to the web posts near the lower chords. The roof slopes towards the sidewalls on an inclination of $\frac{3}{4}$ in. to the foot, excepting in the last 7 ft. where the slope is greater. The gutters are formed by the tile coping of the walls, and drainage is effected by 5-in. wrought iron down-spouts which descend to the ground on the inside of the building.

Jacking Stall an Innovation in Shop Equipment

All brick in the walls excepting the pilasters and the bottom courses and all side construction excepting the bays directly above the base brick wall are carried by the steel columns which also support the roof trusses and the crane rails. For the purpose of assisting the curtain walls in reinforcing the building longitudinally, diagonal sway bracing is provided in the middle one of each of the three high wall bays.

The jacking stall consists of a row of posts imbedded in a heavy concrete slab, between which a car may be run and jacked tightly against its sides, the posts serving as the jack support. It is 57 ft. long and 18 ft. wide and, in addition to the posts, accommodates three rows of U-bolts, the heads of which extend six inches above the concrete for anchoring purposes. The posts, of which there are four in each row, are 15 ft. apart and consist of I-beams 8 ft. high, braced against horizontal thrust by bent rail sections. The distance between the two rows of posts is 15 ft. 3 in.

The car repair shop and jacking stall have been designed and erected under the supervision of A. S. Kent, chief engineer of the Chicago, Indianapolis & Louisville and were built by A. E. Kemmer of Lafayette. All steel used in the structure has been furnished by the Indiana Bridge Company, Muncie, Ind.

Railroad Hearings Before Senate Committee

Adjournment Taken to June 14. J. G. Walber and E. T.

Whiter Explain Labor Questions

WASHINGTON, D. C.

THE HEARINGS before the Senate Committee on Interstate Commerce in the inquiry into the railroad situation were adjourned on June 3 until June 14 to give the committee time to devote some attention to other matters before it. When the hearing was adjourned E. T. Whiter, chairman of the railroad conference committee which represented the carriers before the Railroad Labor Board, had not quite completed his explanation of the situation created by the national agreements. Mr. Whiter will complete his statement when the committee resumes and will be followed by L. E. Wettling, statistician for the Western roads, who is to put in evidence a series of statistical exhibits, and this is expected to conclude the presentation of the railroad case before the committee. No announcement has yet been made as to the order in which other witnesses are to be heard representing the labor organizations, the shippers and others interested.

Mr. Whiter's testimony regarding the effect of the national agreements consisted largely of the same material he had presented before the Railroad Labor Board at the hearings in Chicago. He said the exact cost to the carriers had never been definitely calculated, but that the estimate made by General Atterbury of \$300,000,000 a year was conservative. Mr. Whiter also included a discussion of the effect of the abolition of piecework. Supplement No. 4 to General Order No. 27, he said, by which men employed on piecework were guaranteed the same minimum hourly rate as the workers on an hourly basis, resulted in a decrease ranging from 10 to 40 per cent in the output of men employed on piecework. Tests conducted by four of the largest railroads showed that men formerly employed on piecework were guaranteed 58 cents an hour on work that would have yielded them only from 28 to 36 cents an hour if they had been paid on the piecework basis. This falling off in production became uniformly noticeable immediately after July 25, 1918, when it was known by the pieceworkers that they would receive no increase, but were guaranteed the minimum hourly rate, Mr. Whiter said, and piecework was finally abolished by the director general on December 31, 1918.

Concerning the National Agreements

After Mr. Whiter had explained the effect of many of the rules of the national agreements, the question was raised as to whether the question is in any way within the jurisdiction

of the committee. Senator Poindexter said that the whole question before the committee is as to whether or not the law should be changed in any respect. Senator Cummins said he understood the showing was made in order to account for the extraordinary expenditures of 1920 which the railroads were compelled to make in observing the rules of the national agreement. He said the committee would not want to take up questions which are pending before the labor board or the Interstate Commerce Commission, but it must necessarily go into the same field in order to ascertain whether there should be any additional legislation to relieve the situation and as the investigation was primarily on the question of railroad expenses the committee would want to know whether the money was wisely or necessarily spent.

Several of the Senators expressed difficulty in understanding why the national agreements made by the Railroad Administration should have been in any way binding upon the railroads after the expiration of federal control. Mr. Whiter explained how the question got before the Railroad Labor Board and how the rules of the national agreements were kept in effect by that board at the time it announced its wage award last July. Senator Cummins said that there is nothing in the Transportation Act, in his opinion, which required the railroads to continue for a single moment the agreements entered into between the director general and the men. The railroads might have attempted to change the rules immediately, he said, but the moment they attempted to change the rules and the men resisted that change, that would have created a dispute which both the railroads and the men were bound under the law to submit to the labor board.

Mr. Whiter said that when the bi-partisan board last March took up the requests of the labor organizations for increased wages which were pending at the expiration of federal control, one of the first questions which the labor organizations placed before the committee was the request for the continuation of the national agreements. The railroads took the position that the national agreements were not a part of the dispute and they continued to take that position before the labor board, but the board did assume jurisdiction over them under its Decision No. 2.

Senator Stanley asked whether under the decision of the labor board the railroads are not still under government control. "What effect," he asked, "has the act of 1920 had

except in relieving you with reference to freight rates, so far as the control of the business is concerned? Are you in any more control of it now than you were before?"

Mr. Whiter said that so far as labor questions are concerned, the railroads are still just as much under government control as before, but they have recently made a gain by getting away from centralization because the labor board has decided that in negotiations with the men on these agreements the individual railroad and the men shall negotiate, but so far as the result of the negotiations for new rules is concerned, it would be necessary to see what develops, whether or not the railroads are still bound hand and foot with some of these restricting conditions or whether they are going to be able to negotiate rules that are reasonable to the men and to the companies.

The statement given before the committee by J. G. Walber, secretary of the Board of Information of the Eastern Railroads, was reported in last week's issue. In reply to questions regarding the handling of wage matters during the period of federal control, Mr. Walber pointed out that he was not criticising what was done, saying it is hard at this time to look back and appreciate the position in which the Railroad Administration was situated during the war.

Pressure due to the demands of outside industries, loss of railroad employees for the service, the necessity for prompt action made it impossible for its wage board to study the matters before it as exhaustively as can be done now. "The lack of data, the time necessary to assemble the data, made it necessary for them to adopt short cut methods and any way to get the results and, as one railroad man, I am here to say that I have the utmost sympathy for the conditions under which the board had to do its work and I have not the least criticism of what they did. I think in many respects they did a remarkable job, considering the conditions under which they had to work. I am trying to simply state the facts and state the situation."

Settlements With Railroad Administration

The testimony of Samuel Rea, president of the Pennsylvania, aroused considerable discussion at the hearing regarding the relations of the railroads with the Railroad Administration concerning the application of the standard contracts. Senator Cummins said that if the railroads entered into contracts he assumed that their attitude is that they are content with the proper interpretation of that contract. Mr. Rea said he could not say that the roads were over content with the contract but that they are, of course, willing to stand by it now and it is only a question of the proper construction.

Alfred P. Thom, counsel for the railway executives, made a statement regarding the controversy with the Railroad Administration, saying that the railroads' claim that the proper interpretation of the contract would fully carry out the intent of the federal control and transportation acts as passed by Congress, but that the interpretation placed on the provisions of the contract relating to maintenance by the director general does not carry out the intent of the law. Senator Cummins said that the director general of railroads would be called before the committee before the hearings are concluded in order that he may be given the opportunity to state his side of the case.

The formula for maintenance contained in the standard contract, Mr. Thom said, is an agreed method of ascertaining whether or not the director general has redeemed his contract to keep the properties in repair and return them in good condition. He was to expend on the property as much money as the carriers expended on the average in the test period and to fairly distribute it over the property, the amounts of money to be adjusted to the different levels of the cost of labor and the cost of material during the federal control period. Moreover, the contract provides, he said, that that

shall be done so that the result shall be as nearly as practicable the same relative amount, character and durability of physical reparation.

The director general, he said, contends that he is not responsible for actual physical reparation if he spends a certain amount of money. Calling attention to the fact that all the members of the committee present are lawyers, Mr. Thom said that the agent of the President, acting under an act of Congress as well as under instructions from his principal, will not be construed to have violated those instructions and to have departed from the act of Congress unless there is no other interpretation which can reasonably be put upon the contract. If there is any reasonable construction of the contract which will put what he did in conformity with his instructions and the act of Congress, that construction must be adopted.

Senator Pomerene said he did not quite see the force of Mr. Rea's suggestion that there might be an amendment to the Transportation Act, because if the question were put up to Congress again it might take a position in entire accord with the position taken by the director general. Mr. Rea said he had only made such a suggestion if it were the only way to avoid a delay of three to five years. If Congress should take the view of the railroads it might bring about a quicker settlement. He thought, however, that the President had full authority and discretion under the law. Mr. Rea said there also seemed to be a difference of opinion among members of the Interstate Commerce Commission in interpreting the maintenance provisions of the standard contract as it applies to the expenditures for the six-months' guaranty period of 1920, because they have not yet reached a conclusion and large sums still due to the railroads for that period are thus withheld. Mr. Rea said that the Pennsylvania's estimate of undermaintenance for roadway and structures for the period of federal control is in the neighborhood of \$40,000,000. As to the maintenance of equipment, the final estimate is not yet concluded.

Railroads Add to Equipment

THE Car Service Division of the American Railway Association has issued its quarterly equipment report for Class I roads for the quarters ended March 31, which shows a net increase over retirements for the quarter of 166 locomotives, 4,591 revenue freight cars, 67 non-revenue freight and 176 passenger cars; while on March 31 there were on order 390 locomotives, 20,340 freight cars and 668 passenger cars.

A summary of the report follows:

	Jan. 1 to March 31		Total Ownership March 31, 1921	Number on order
	Acquirements	Retirements		
Locomotives:				
Freight	328	206	39,502	217
Passenger	85	85	14,507	54
Switchers	110	66	11,551	119
Total	523	357	65,560	390
Rev. Frt. Cars:				
Bx. Auto and Furn.....	7,068	6,222	1,050,731	6,118
Refrigerators	2,671	310	62,274	2,420
Coal and Coke.....	7,950	5,967	995,427	8,269
Stock	508	773	80,453	2,295
Flat	679	1,011	104,618	488
Miscellaneous	159	161	49,249	120
Total	19,035	14,444	2,342,752	20,340
Non-Rev. Cars	1,360	1,293	138,963	676
Passenger Equip.:				
All Steel	178	5	15,646	667
Steel U. F.....	89	...	6,459	...
Wooden	38	124	31,288	1
Total	305*	129	53,393	668†
*Coaches	113			417
Comb.	14			24
Bag. & Ex.....	133			178
Other	45			49
Total	305			668
†Coaches				417
Comb.				24
Bag. & Ex.....				178
Other				49
Total				668

Signal Section Holds Annual Meeting In Chicago

Proper Signal Location for Efficient Train Movement, Valuation and Other Subjects Are Presented

THE PROPER LOCATION of automatic block signals to direct train movements most economically and effectively, while at the same time affording safe operation, formed the basis of a report which received special attention at the annual meeting of the Signal section, Engineering Division, American Railway Association, which was held at the Drake Hotel, Chicago, on June 6, 7 and 8. This is the third annual meeting of the Signal section and the twenty-sixth annual convention of the former Railway Signal Association. Chairman F. W. Pfleging (U. P.) presided. There was a total attendance of about 300. This meeting is the first held since the stated meeting at New York on December 2 and 3, 1920, as the March stated meeting always held heretofore in connection with the annual meeting of the American Railway Engineering Association at Chicago was cancelled this year.

Chairman Pfleging, in his opening address, commented on the results of the past year's work, pointing out the good accomplished by the Sectional committee meetings in advancing the knowledge of signaling among the rank and file of the men. In pointing out how the field of action is enlarged each year, Mr. Pfleging called attention to the co-operation of the Signal section with the Interstate Commerce Commission in connection with the investigation of automatic train control. He also stated that it is not enough to work on improving and systematizing the signal apparatus but that it is necessary to find new uses for the improved apparatus. In this connection he stated that it is the tonnage train kept moving which returns interest on capital invested and that this movement can be facilitated by eliminating train orders and by communicating the movements which will be made by signal indication. In order to facilitate such work and to promote increased efficiency by signal operation the chairman recommended that a Joint Committee on the Economics of Railway Signaling be appointed, this committee to consist of operating and signal members.

H. S. Balliet (N. Y. C.), secretary of the Signal section, presented his annual report covering the membership and a general outline of the work accomplished by the committees during the period from July 17, 1920, to June 5, 1921. The membership as of July 10, 1920, was 1,510; a total of 276 were enrolled during the last year while 15 were reinstated; the losses during the year totaled 234, giving a total net membership of 1,567 as of June 5, 1921. Five meetings were held by the Committee of Direction, at which 17 subjects were considered. The standing committees had 29 meetings and considered 83 subjects while 36 Sectional committee meetings were held at which 52 different subjects were discussed. There was a total attendance of 2,740 at these meetings. Forty subjects were submitted to the annual meeting for acceptance and submission to letter ballot and 12 publications have been issued during the period covered by this report. Thirteen of the 18 standing committees of the Signal section presented reports with subject matter for submission to letter ballot, for discussion, or as information.

Proper Location of Automatic Block Signals

Committee No. X—Signaling Practice, W. J. Eck (Southern), chairman, submitted for consideration reports on various types of light signals, day and night indication; requisites of signal locations for automatic block signals; automatic train control; application of aspect indicating that train must take siding having non-interlocked switch.

The following requisites for light signals were presented and it was recommended that they be accepted for submission to letter ballot for inclusion in the manual:

1. They shall be free from the possibility of phantom indications.
2. When lamps are operated at normal voltage, the range (on tangent) of signals used to govern high speed trains, must be at least 2,500 ft. on a clear day with a bright sun at or near the zenith.
3. They shall not be so bright as to cause confusion in reading signals at night.
4. Normally a beam spread of 6 deg. each side and below the axial beam shall be provided. Means shall be provided for increasing the beam spread on either side to suit special conditions.
5. Means must be provided to give a distinct indication to enginemen when approaching and when stopped at the signal.

Beam spread is interpreted to refer to points at the angle mentioned where the intensity of the beam is 50 per cent of the axial beam candle power.

The report on requisites of signal location for automatic block signals—which the committee recommended be accepted as information—covers 12 pages of the journal and has in addition 9 diagrams. In the introduction the Committee says:

In the treatment of locations for signals, main consideration has been given to those locations which will most economically and effectively direct train movements, not losing sight of arrangements which afford safe operation.

The subject is first treated with respect to signals for single track railways since more factors enter into the proper locations of signals for these lines than for lines where the normal traffic is in one direction only and much of the reasoning covering following movements for single track roads will apply to the signaling of two or more tracks with traffic of one direction.

Clear vision of signals is important and their location on curves near overhead structures or at other points where the view is obstructed should be avoided in so far as practicable. It is also desirable to avoid their location on bridges supporting the track signaled and such other points where an element of risk may enter into trainmen alighting from a train which has been stopped at a block signal.

In two-position signaling it is desirable that distant signals be not placed too far to the rear beyond the stopping distance to home signals, the approach to which they regulate. So also in three-position signaling, since each signal acts as a distant signal to the next preceding one, consideration should be given to the avoidance of too long blocks. The reasons for this are:

To avoid enginemen running for a considerable time after receiving a caution indication involving, for those roads which require an immediate caution movement at a caution signal, a slowing up of traffic.

To avoid, on those roads requiring an interpretation of a caution signal as indicating the next signal at stop, a tendency for enginemen to forget, after a lapse of some minutes entailed in running this distance, the indication of the caution signal last passed.

To minimize the time, by shortening the space consistent with stopping distance, in an endeavor to preclude opportunity for change in conditions in the second block ahead during the time a train runs between a given proceed signal and the next preceding one.

The following terms have been used which may require some explanation:

A differentiation is made between the meaning of stopping distance and braking distance.

Stopping distance is taken to mean the distance in which any train, operating in the territory involved, can stop and then be in a position with respect to its air apparatus and draw bars to again start.

Braking distance is taken to mean the distance required to

stop any train in territory involved. The train may not necessarily be in condition again to start with ease.

Sighting distance is taken to mean that distance to the rear of a signal in which a following train may have time to observe the signal and also in order that the signal may have time to assume its proceed position after a preceding train has passed out of that section of track controlling the signal.

Time spacing is taken to mean the time required for a train to run over that portion of the line which controls the proceed position of a signal.

Considering now that signals as covered in the subject are fundamentally for the purpose of directing train movements, they must obviously be arranged effectively to provide for: (a) Meeting trains. (b) Passing trains. (c) Spacing trains.

Automatic Train Control

In reporting on automatic train control the committee outlined the work which had been accomplished by the Joint Committee on Automatic Train Control of the American Railway Association and the Interstate Commerce Commission, the duties of which are as follows:

- (a) Prescribe rules and requirements for tests of automatic train control devices.
- (b) To review the work already done by previous committees in the testing of appliances and to bring the work up to date.
- (c) To confer with representatives of the Interstate Commerce Commission in the consideration of this subject.
- (d) To arrange with the carriers for practical tests as may seem advisable, and to arrange for the terms and conditions of such tests.
- (e) To arrange for necessary record of performances and cost of installation and maintenance and comparisons.
- (f) That at all times to co-ordinate their work with that of the representatives of the Interstate Commerce Commission, and to work in co-operation with such representatives.

Information was also presented on the work which had been done by the New York Central-New York State Public Service Committee on automatic train control.

The report on this subject was recommended for acceptance as information.

Take-Siding Signal

In reporting on the application of aspects indicating that a train must take siding at a non-interlocked switch, the following was submitted with the recommendation that it be accepted for submission to letter ballot for inclusion in the Manual:

1. The aspect for instructions to trains to take siding at a non-interlocked switch shall be provided by the display of the letter "S."
2. The day and night indications shall be distinctive from other forms of signal.
3. Where located less than braking distance from the switch, an approach indication shall be provided.
4. Its mounting may be either on a separate mast, or on any signal mast best suited to meet the requirements.
5. The minimum distance of visibility under normal conditions shall be 500 ft.
6. When not functioning, the indicator shall not be visible.

Discussion

All reports, with the exception of the one on automatic train control, met with little or no discussion. J. B. Latimer, signal engineer, Chicago, Burlington & Quincy, went on record as opposed to speed control in connection with automatic train control. It was his feeling that an automatic train stop would amply serve all requirements and he made reference to the use of such a train stop and the results obtained on the Chicago & Eastern Illinois. It was his personal opinion, however, that there would be no necessity for an automatic train control or train stop if an audible warning were used at distant signal locations to indicate audibly the caution position of the signal. Others expressed the feeling that the signal section was 10 or 15 years behind times on the automatic train control question and that one cause of this was the effort to obtain the ideal rather than allow this device to pass through the development stages that is required of any other device which has been adopted in the past. Com-

mittee X would not assume any responsibility for the report on this subject, stating it represented data which has been developed by the government and the Joint Committee on Train Control and that it was given as a matter of information.

Valuation

Committee No. XV—Valuation, J. M. Carley (B. & A.), chairman, submitted reports on the following subjects:

1. Report on average service life in years of the important units of the different types of signal installations.
2. Prepare typical construction program which will include the various types of interlocking, automatic signals and other signal apparatus for: (a) Single-track railroad. (b) Double-track railroad. (c) Three-track railroad. (d) Four-track railroad.
3. Prepare table of relative value units of signal installations.

Under subject 1, the average minimum and maximum service life and the average service life of a large number of units used in signal construction were presented for discussion and for acceptance as information.

Under subject 2, referring to such a program for signaling the committee stated that "after a careful study of the requirements and analysis of the discussion in committee meetings and certain recommendations by letter, the committee recommended that the following outline of, and instructions for, preparing construction programs be accepted as a report on item 4 of the outline of work for the reason that no typical program, however carefully prepared, would be of value to any except a very small percentage of the carriers interested. Each carrier must necessarily investigate the conditions for itself and it is the consensus of opinion that the following outline and instructions will serve the purpose for which the instructions of the committee were initiated." This subject was presented for discussion and for acceptance as information.

Discussion

Committee XV-Valuation, presented a supplemental report for discussion and acceptance as information. This report was based upon an editorial appearing in the *Railway Age* of March 16, 1920. It suggested a method or scheme which may be employed by the various signal departments for keeping a record of the various major units from the time of their installation to their retirement.

It was the recommendation of the committee that a record be kept of the units for property changes. This record should include:

1. Property record in statement form of each change during the life of the installation.
2. Plans showing each change to be indexed or filed with the property record.

The committee presented the following for discussion and action by the section, to the end that a recommendation be made to the Bureau of Valuation, Interstate Commerce Commission, that the instructions governing reports in connection with Valuation Order No. 3 be changed as follows:

Paragraph 7, page 7, of the Second Revised Issue of Valuation Order No. 3.

PRESENT FORM.

Where one carrier assumes the cost of a change upon another carrier's property, or where one or more carriers participate with the owner in the cost of a change in the latter's property, the full detail of the property units involved and their costs shall be recorded in but one set of records, and they shall be the records of the carrier to which the property in which the change has been made was originally inventoried by the commission.

RECOMMENDED FORM

Where one carrier assumes the cost of the change upon another carrier's property, or where one or more carriers participate with the owner in the cost of a change in the latter's property, the full detail of the property units involved and their cost shall be recorded in but one set of records, and they shall be the records of the carrier that originates the charges for changes in the property.

This is desirable due to the fact that many joint plants were inventoried to the carrier which does not originate charges for changes in the property on account of the government field party reaching such points before parties on the other line had reached them.

It was recommended that the section take such action as will bring this matter to the attention of the Bureau of Valuation, Interstate Commerce Commission.

Under subject 3, Units for Use in Signal Valuation, the committee presented units for the record of property changes under accounts 15 and 27. These units were subdivided under primary units and the list was submitted as a guide as to what would be required, with the thought in mind that each carrier is to arrange the list to suit the characteristics of its property. This report also was presented for discussion and acceptance as information.

D. C. Track Circuits

Committee No. XVIII—D. C. Track Circuits, A. R. Fugina (L. & N.), chairman, in submitting a report on specifications of characteristics of track circuits outlined the general conditions existing with reference to a study of this subject. The most important factor, and the one over which the signal engineer has absolutely no control, is the train shunt. Little information about the train shunt under varying conditions is available. Such investigations as have been made by this committee seem to point to the fact that on main track rails the shunting resistance of even a single car or a single pair of wheels is much less than .06 ohm and that for the usual fouling circuit of a switch, the shunting resistance may be less than .06 ohm, but often is much greater. The committee is developing information and data about the shunt resistance under varying conditions, so that it may submit a definite recommendation.

The minimum releasing point of the track relay in service is a vital factor in the safety of the track circuit. This will bear a direct relation to the maximum resistance of the track shunt. It is highly desirable to decrease the rail resistance. Decreasing rail resistance reduces the adverse effect of low ballast resistance. Economy and reliability of operation may therefore be obtained by reducing the rail resistance instead of expending money to increase the ballast resistance.

The report was presented at this time for discussion and acceptance as information only.

A general discussion on track circuits brought out the necessity of devising some means of improving the protection to be afforded by the track shunt fouling circuit at switches. It was the general opinion that with or without improvements in this feature pipe-connected derails should be required on all turnouts in automatic signal territory.

Other Committee Reports

Committee No. XIV—Contracts, R. C. Johnson (B. R. T. System), chairman, presented four standard forms with the recommendation that they be submitted to letter ballot for inclusion in the Manual. The first form covered an invitation to bidders on block signal and interlocking work; the second was the contractor's proposal for block signal and interlocking work; the third was a standard form of bond to accompany contracts for block signal and interlocking work, while the fourth form submitted covered the proposed contract for execution in connection with block signal and interlocking work.

Committee No. V—Maintenance Rules and Instructions, G. K. Thomas (A. T. & S. F.), chairman, presented two reports and recommended their submission to letter ballot for inclusion in the Manual. The first report covered rules for signal maintenance intended to supersede rules 751 to 777 inclusive and 782 to 784 inclusive now contained in the Manual under the heading Rules for Signal Maintainers.

The remaining 19 rules now in the Manual under this heading have reference to interlocking, batteries, lamps and pole line and will be covered under those heads in later reports. The second report consisted of examination papers on signal maintenance and included 102 questions and answers.

When the maintenance rules and the set of examination questions and answers were presented exceptions were taken to a number of rules because of the liability of their being misinterpreted, particularly with reference to conditions affecting men working at the same place but in different departments. A number of revisions were presented and accepted, after which the entire report was accepted for submission to letter ballot for inclusion in the Manual.

Committee No. VIII—Alternating Current Automatic Block Signaling, C. H. Morrison (N. Y., N. H. & H.), chairman, submitted for consideration a report on calculating power supply and distribution for an alternating current signal system. This report covered the choice of voltage, frequency and transmission and treated of the material of the conductors and their size with paragraphs on wire and pole spacing, sectionalizing, center of gravity of load, line losses, lightning protection, commercial source of supply, power equipment and calculating forms. The calculating forms consisted of power summary sheet, engineering data sheet and load diagram, which were recommended for use in calculating power requirements. These sheets were also submitted with the report and the committee recommended it for acceptance and submission to letter ballot for inclusion in the Manual.

In addition to the above reports others were presented by Committee I—Editing, H. S. Balliet (N. Y. C.), chairman; Committee II—Mechanical Interlocking, C. J. Kelloway (A. C. L.), chairman; Committee III—Power Interlocking, F. B. Wiegand (N. Y. C.), chairman; Committee IV—D. C. Automatic Block Signals, C. F. Stoltz (C. C. C. & St. L.), chairman; Committee VI—Standard Design, F. P. Patenall (B. & O.), chairman; Committee XI—Batteries, A. B. Himes (B. & O.), chairman; Committee XIII—Electrical Testing, P. M. Gault (I. C.), chairman.

Other Reports and General Business

Committee No. 3, on power interlocking, presented specifications for a circuit controller for draw bridges, which after brief discussion was referred back to the committee for revision. After some discussion a specification for electric-motor switch-operating and locking mechanism, together with an operating and overload curve chart was adopted for submission to letter ballot for inclusion in Manual.

In connection with the progress report of Committee 16, oils, the discussion brought out the fact that the specifications for illuminating oil for switch and signal lamps had been adopted by the American Railway Association and that one road, operating 500 miles of line, had saved \$500 in one year by following these specifications.

A general discussion on the education of signal department employees resulted in approval of a recommendation that the sectional committees offer programs of practical educational value and that copies of the proceedings be furnished to all those interested.

R. H. Aishton, president of the American Railway Association, in a brief address to the Signal Section, complimented it on the volume and quality of work completed during the past year. The keynote of his address was that the Signal Section has been entirely too modest with respect to its accomplishments and that it was the duty of each and every representative to tell his railroad management what good has really been accomplished by the Section. In this connection he called attention to the showing made on the road mentioned above by following the specifications for oils prepared by this Section and adopted by the American Rail-

way Association. In submitting reports to the executive committee of the A. R. A. Mr. Aishton recommended that the committees incorporate as an opening paragraph of their reports an outline of the purpose and the important results to be obtained through the adoption of the report.

After miscellaneous business was disposed of the Secretary announced that the next meeting of the Signal Section would be the regular New York meeting, to be held on November 3, at the McAlpin Hotel.

Signal Section Officers Elected

The following officers for the Signal section were elected for the ensuing year: F. B. Wiegand (N. Y. C. Lines West), chairman; C. A. Christofferson (N. P.), first vice-chairman; B. T. Anderson (D. L. & W.), second vice-chairman. Those elected to serve three years on the Committee of Direction are: W. J. Eck (Southern); F. W. Pfleging (U. P.); W. Y. Scott (B. & M.); and W. M. Vandersluis (I. C.).

Signal Appliance Association

The officers of the Signal Appliance Association, chosen for the ensuing year at a meeting held at the Drake Hotel, Chicago, are: Chairman, Henry Lee, *Railway Age*; vice-chairman, G. A. Blackmore, Union Switch & Signal Co.; secretary-treasurer, F. W. Edmunds, Sunbeam Electric Man-

ufacturing Co., New York. Those elected to serve on the Executive committee for two years are: M. R. Briney, Federal Signal Co., Albany, N. Y.; W. J. Gillingham, Hall Switch & Signal Co., Garwood, N. J.; John Roberts, General Electric Co., Schenectady, N. Y.; and F. J. Lebreau, Macbeth-Evans Glass Co., Pittsburgh, Pa. E. A. Condit, Rail Joint Co., N. Y., was appointed chairman of the Arrangement Committee.

The Trend of Railway Earnings Shown in Charts

By Henry M. Sperry, M. Am. Soc. C. E.

DANIEL WILLARD, president of the Baltimore & Ohio in an address before the annual meeting of the National Civic Federation at New York last February, made the statement: "I think that the most constant and persistent problem that confronts the railroads at all times, through all seasons and all periods, is the problem that grows out of being misunderstood. The railroads are such a large undertaking and we have to talk in figures that we so little comprehend that this difficulty is ever present. . . . The

TABLE 1—STATISTICS OF CLASS I RAILWAYS—UNITED STATES

(Railways Having an Annual Operating Revenue above \$1,000,000)
(Does Not Include Switching and Terminal Companies)

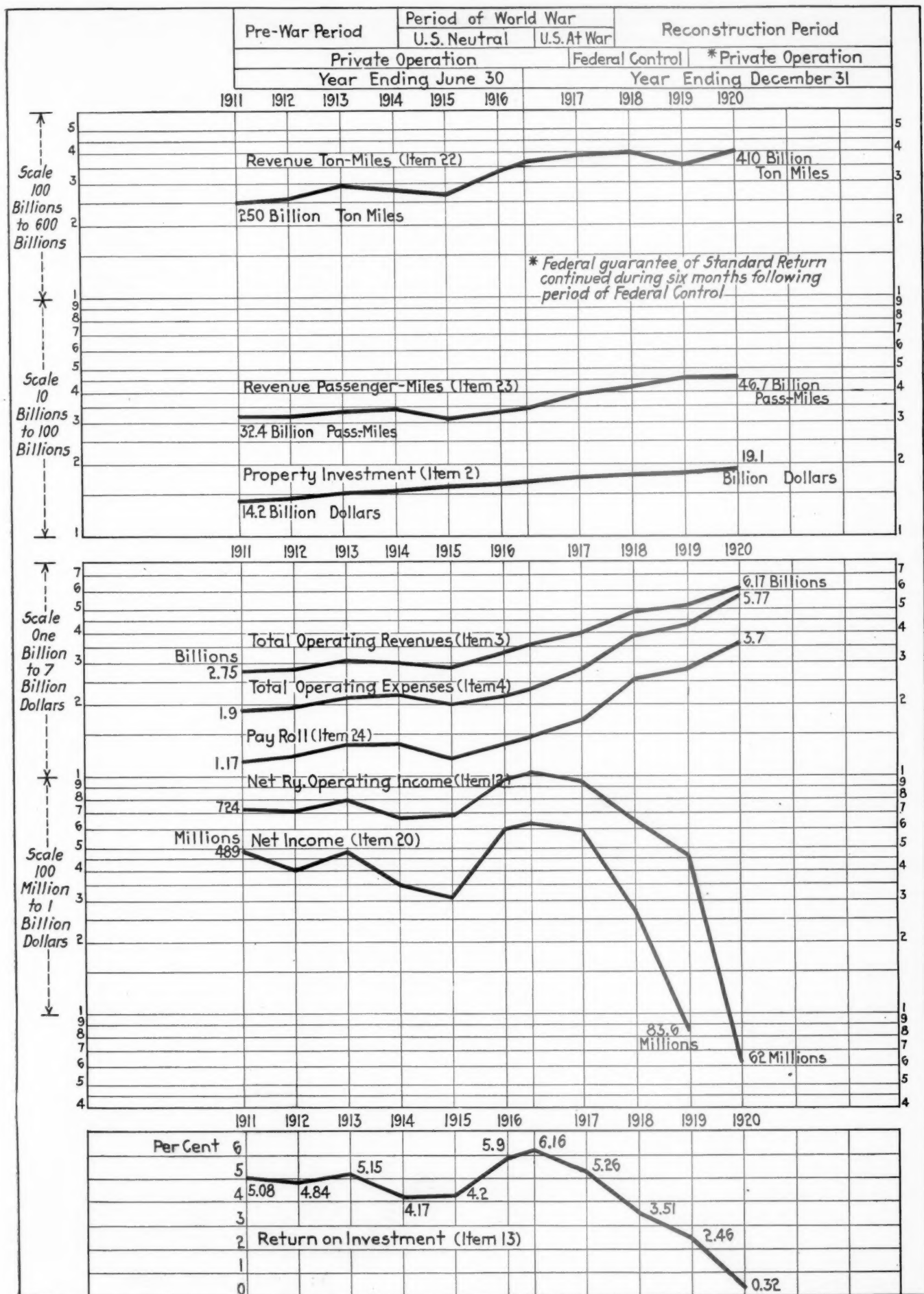
Item	Fiscal years ended June 30—					
	1911	1912	1913	1914	1915	1916
1. Miles of track operated—main track.....	244,300.77	249,192.74	254,821.20	259,139.53	262,424.88	264,920.40
2. Property investment—Class I roads and their non-operating subsidiaries (investment in road and equipment, exclusive of materials and supplies).....	\$14,246,167,475	\$14,632,497,022	\$15,284,763,489	\$15,842,127,273	\$16,257,146,632	\$16,688,440,056
3. Total operating revenues.....	2,752,497,297	2,805,006,544	3,108,361,215	3,031,326,963	2,871,563,047	3,381,597,866
4. Total operating expenses.....	1,902,994,333	1,959,094,811	2,173,463,563	2,203,423,812	2,021,160,614	2,210,892,786
5. Operating ratio—per cent.....	69.14	69.84	69.92	72.69	70.39	65.38
6. Net operating revenue.....	849,502,964	845,911,733	934,897,652	827,903,151	850,402,433	1,170,705,080
7. Railway tax accruals.....	98,626,848	109,445,407	118,386,859	135,572,579	133,276,330	145,517,034
8. Uncollectible railway revenues.....					649,917	806,747
9. Railway operating income.....	750,876,116	736,466,326	816,510,793	692,330,572	716,476,186	1,024,381,299
10. Hire of equipment—net balance.....	Dr. 15,577,534	Dr. 15,772,338	Dr. 15,611,817	Dr. 17,686,287	Dr. 19,128,943	Dr. 23,564,582
11. Joint facility rents—net balance.....	Dr. 11,113,874	Dr. 12,209,605	Dr. 13,288,541	Dr. 13,626,138	Dr. 14,242,410	Dr. 15,943,758
12. Net railway operating income (Stand. ret. basis).....	724,184,708	708,484,383	787,610,435	661,018,147	683,104,833	984,872,959
13. Rate of return on investment—per cent.....	5.08	4.84	5.15	4.17	4.20	5.90
14. Other income (including Miscel. operating income).....	273,767,609	219,308,972	241,629,540	243,768,847	186,232,946	192,709,534
15. Total income.....	997,952,317	927,793,355	1,029,239,975	904,786,994	869,337,779	1,177,582,493
16. Rent for leased roads.....	124,960,314	129,046,148	133,018,154	122,592,248	122,528,657	139,215,095
17. Interest on funded debt.....	345,843,570	359,881,461	368,134,889	373,296,354	387,029,566	399,348,125
18. Interest on unfunded debt.....	18,116,228	16,735,942	23,045,616	35,958,511	27,509,366	15,066,312
19. Other deductions.....	19,996,896	21,505,611	19,295,321	22,218,263	16,114,112	20,730,068
20. Net income available for dividends, etc.....	489,035,309	400,624,193	485,745,995	350,721,618	316,156,078	603,222,893
21. Total dividends declared out of income and surplus.....	397,068,724	339,964,855	322,300,406	376,098,785	259,809,520	281,936,372
22. Revenue, ton-miles.....	249,843,166,302	259,981,628,198	297,722,528,693	284,924,749,718	273,913,006,569	339,870,323,675
23. Revenue, passenger-miles.....	32,371,444,793	32,216,262,549	33,875,085,958	34,566,985,414	31,789,928,187	33,645,908,150
24. Aggregate compensation of employees.....	1,167,856,000	1,209,716,686	1,338,612,385	1,337,344,135	1,190,223,755	1,366,100,518

Item	Calendar years ended December 31—				
	1916	1917	1918	1919	1920
1. Miles of track operated—main track.....	265,802.97	267,574.12	269,174.54	270,556.62	*
2. Property investment—Class I roads and their non-operating subsidiaries (investment in road and equipment, exclusive of materials and supplies).....	\$16,884,440,038	\$17,762,152,127	\$18,213,629,613	\$18,529,749,653	b19,100,000,000
3. Total operating revenues.....	3,596,865,766	4,014,142,748	4,880,953,480	5,144,795,154	a\$6,171,493,301
4. Total operating expenses.....	2,357,398,412	2,829,325,124	3,982,068,197	4,399,715,515	5,768,720,013
5. Operating ratio—per cent.....	65.54	70.48	81.58	85.52	93.47
6. Net operating revenue.....	1,239,467,354	1,184,817,623	898,885,283	745,079,639	402,773,288
7. Railway tax accruals.....	157,113,372	213,920,095	223,175,379	232,601,396	278,868,668
8. Uncollectible railway revenues.....		797,486	700,090	916,889	1,224,980
9. Railway operating income.....	1,081,556,496	970,197,438	675,096,083	511,561,354	122,679,640
10. Hire of equipment—net balance.....	Dr. 23,767,262	Dr. 17,999,098	Dr. 15,676,577	Dr. 33,488,828	Dr. 33,086,318
11. Joint facility rents—net balance.....	Dr. 17,704,717	Dr. 18,129,570	Dr. 20,850,903	Dr. 22,087,578	Dr. 27,664,696
12. Net railway operating income (Stand. ret. basis).....	1,040,084,517	934,068,770	638,568,603	454,984,953	61,928,626
13. Rate of return on investment—per cent.....	6.16	5.26	3.51	2.46	0.32
14. Other income (including miscel. operating income).....	210,066,879	233,252,283	309,067,492	272,172,994	*
15. Total income.....	1,250,151,396	1,167,321,053	947,636,095	727,157,947	*
16. Rent for leased roads.....	158,377,958	132,082,177	126,977,239	123,276,608	*
17. Interest on funded debt.....	406,667,567	403,305,438	396,465,997	404,089,456	*
18. Interest on unfunded debt.....	14,854,425	15,704,857	29,933,496	42,722,596	*
19. Other deductions.....	23,370,773	23,197,975	125,598,013	73,460,852	*
20. Net income available for dividends, etc.....	646,880,673	593,030,606	268,661,350	83,608,435	*
21. Total dividends declared out of income and surplus.....	306,176,937	320,395,779	275,336,547	278,516,908	*
22. Revenue, ton-miles.....	362,444,397,129	394,465,400,493	405,379,284,206	364,293,063,017	409,970,656,000
23. Revenue, passenger-miles.....	34,585,932,026	39,476,858,549	42,676,579,199	46,358,303,740	46,724,880,000
24. Aggregate compensation of employees.....	1,468,576,394	1,739,482,142	2,613,813,351	2,843,128,432	3,698,216,351

*Not yet available. a Total operating revenues for 1920, includes \$64,508,260 of back mail pay collected in 1920, but applicable to services rendered 1917, 1918 and 1919. b Partially estimated.

Note—Net railway operating income, as shown above for 1918, 1919 and 1920, represents the actual earnings from operation of the Class I railways. The "standard return" for these roads (i. e., the net operating income after collecting rental from the U. S. Government), amounted to approximately \$898,500,309 for the years 1918 and 1919, and for 1920 amounted to approximately \$825,000,000, taking into account two months of Government operation, six months of Government guarantee and four months of private operation.

Bureau of Railway Economics, Washington, D. C., March 29, 1921.



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Fig. 1—Leading Factors in Railway Earnings on a Ratio Scale, for a Clearer Comprehension of Relationship

trouble is that we talk in such big figures all the time that no one understands what we are talking about. When we get into billions, millions become minimized. They lose their relative value."

The present article is an attempt to work out a method

Table II—Important Dates

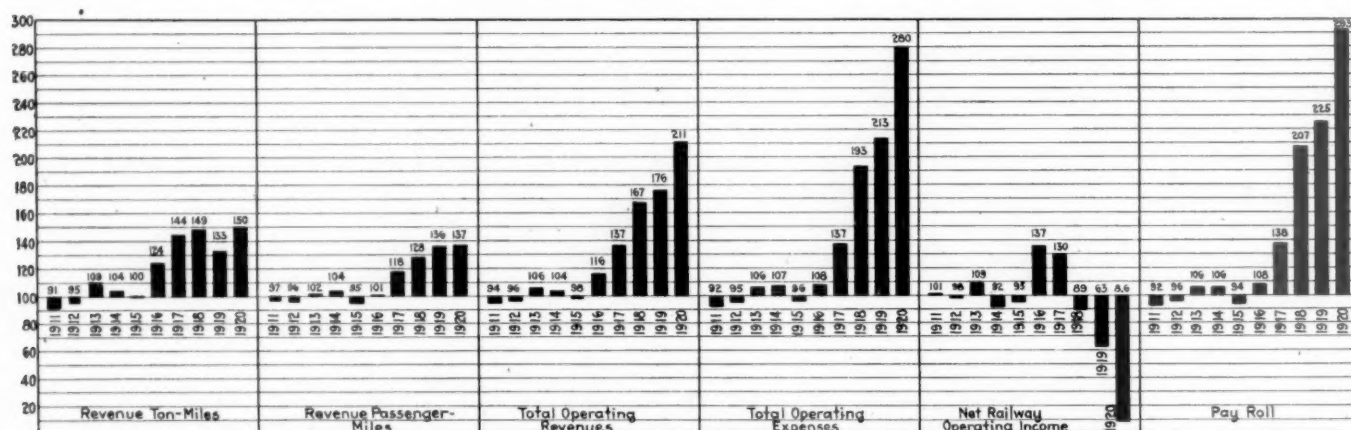
World War—Austria declared war on Serbia...	July 28, 1914
Adamson Act approved.....	September 3 and 5, 1916
Adamson Act effective.....	January 1, 1917
United States entered World War.....	April 6, 1917
Federal Control began at noon.....	December 28, 1917
Armistice declared.....	November 11, 1918
Transportation Act approved.....	February 28, 1920
Federal Control ended.....	February 29, 1920
Federal Guaranty Period from.....	March 1, 1920
Federal Guaranty Period to.....	September 1, 1920

which permits of a clearer understanding of the relationships between the various factors of railway traffic and earnings and more particularly to show the relationships between those figures expressed in millions and those expressed in billions. One of the charts is worked out in the form of curves plotted on the ratio scale, while in the other the various values are plotted as percentages. The charts point out clearly the great increase in traffic handled in recent years, the great increase in revenues, and show how the still greater increases in cost of operation, more particularly in wages,

not include the standard return for the period of federal control or the guaranty for the guaranty period from March 1 to August 31, 1920. The third part of the chart shows the return on the investment; i.e., the relationship between the net railway operating income and the total property investment.

In this chart the most striking feature is the increase in railway operating expenses, the great increase in the pay roll and the sharp decline in net income. The ratio scale used in these charts is for the purpose of showing relative changes. An increase or decrease of a given percentage in any item on the chart will show the same degree of upward or downward inclination regardless of the magnitude of the item or its position on the chart. If the ordinary arithmetical scale were used the fluctuations in the large items would be more pronounced than the same relative fluctuations in the smaller items.

In Fig. 2 these figures have been put in the form of percentages, based on the years 1911 to 1914 as an average of 100. The chart shows that in the year 1920 as compared with the average of 1911-1914, the Class I railroads of the United States handled 150 per cent of the revenue ton miles of the average 1911 to 1914 and 137 per cent of the revenue passenger miles. This greater transportation service yielded



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Fig. 2—Railway Traffic, Earnings and Expenses Shown in Percentages of the Average for 1911 to 1914 as 100

have succeeded in reducing and almost eliminating net income.

Fig. 1 is in three parts. It covers the years from 1911 to 1920 and shows (a) the revenue ton miles of traffic in these

Table III—Wage Advances During Federal Control

To all employees, January 1, 1918.....	\$360,000,000
To shopmen, January 1, 1918.....	209,000,000
To maintenance of way employees and clerks, September 1, 1918.....	190,000,000
To agents and telegraphers, October 1, 1918.....	25,000,000
To dining and sleeping car employees, January 1, 1919.....	8,000,000
To enginemen and trainmen, January 1, 1919.....	60,000,000
To shopmen, May 1, 1919.....	50,000,000
To enginemen and trainmen (time and one-half in road freight service), December 1, 1919.....	38,000,000
To maintenance of way employees (time and one-half for overtime), December 16, 1919.....	25,000,000
To clerks (time and one-half for overtime), January 1, 1920..	25,000,000
Total.....	\$990,000,000

May 24, 1921 (a).

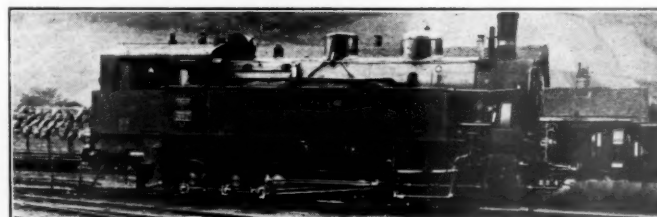
RATE INCREASES

June, 1918—Director-General increased freight rates approximately 28 per cent, and passenger rates approximately 22 per cent.
August 26, 1920—I. C. C. increased freight rates about 33 per cent and passenger rates 20 per cent, with a 50 per cent surcharge on Pullman fares.

years; the revenue passenger miles and the property investment; (b) the total operating revenues, the total operating expenses, the pay roll, the net railway operating income and the net income available for dividends. The latter figure does

211 per cent of the operating revenues of the 1911 to 1914 period, but as the operating expenses reached a figure of 280 per cent, principally because of an increase which brought wages up to a ratio of 293, the net railway operating income was reduced to but 8.6 per cent of what it was in the years from 1911 to 1914.

The figures from which these charts were made up were compiled by the Bureau of Railway Economics and are given in Table I. For the purpose of making the information readily available Tables II and III are given to show some of the important factors which resulted in the figures which are indicated on the charts.



An Austrian Switch Engine

Carriers Again Ask Labor Board to Decrease Wages

Restoration of the Rates of Pay in Effect Prior to Decision No. 2
Requested by Many Railroads

REPRESENTATIVES of eastern and western railroads assailed the recent \$400,000,000 wage cut authorized by the Railroad Labor Board, the standardization of railway employees' wages and the payment of time and one-half for overtime in freight and yard services in reopening the wage question before the Labor Board on June 6. The recent wage cuts, considered in connection with the data presented to the board at the previous hearings by the carriers, are not large enough and should be increased so as to restore the rates of pay in effect prior to the wage increase of last July, according to the testimony presented at the opening session. The standardization of wages and the payment of time and one-half for overtime in freight train service were attacked by J. G. Walber, representing the eastern roads, who suggested in lieu of the former, that standardization of wages extend only to those rate making groups fixed by the Interstate Commerce Commission.

In opening the hearings, which are a continuation of the hearings which began on April 18 and which have been reported currently in the *Railway Age*, Mr. Walber said in part:

Since the submission by the railroads of their exhibits in April, the downward movement in the cost of living, and in the rates of pay in outside industries has continued and is still continuing. It is evident that there is a general necessity for revisions of the wage scales in all classes of employment. These changes will unquestionably have a pronounced influence upon costs of all kinds, including the cost of living, and will, in our opinion, require in the very near future much greater reductions in the scales of the railroad employees than have been asked up to this time. If the elements set out in Section 307 of the Transportation Act are in control of the situation, and we believe that it was the intent of Congress that they should be given the most specific and direct application that the conditions would permit, a very serious situation will be constantly before us, and it requires very serious consideration whether, in view of the constant changes which are taking place in this period of readjustment it is possible to continue to handle these readjustments of the wages of railway employees in the manner which is now being pursued and the necessities of adjustment of individual classes with relation to all classes.

In other words, the question before us is whether it is to be impossible to make adjustments in the wage scales of one class of employees without involving all other classes. We realize that this is not a matter which can be decided at this time; in fact, it may not be necessary to decide it at this time, but with the diversified conditions in the commercial industries and with the great many different classes of employment in the railroad service, we assert that Section 307 of the Transportation Act does not contemplate that specific relations between wage scales of the various classes should be continued, and that one class cannot be changed without affecting every other class. The Transportation Act itself recognizes that there are differences in the commercial necessities in the different parts of the country, by the establishment of the different rate regions, and as that act requires the Interstate Commerce Commission to give direct consideration of the wage scales in their decisions affecting traffic rates, there appears to be sound reason for holding that in any circumstances the largest area to be considered by the Labor Board in determining wage scales should correspond with these traffic rate regions. In fact, we repeat that Section 307 requires making the most direct comparisons possible, even to the extent of subdividing carriers, if the conditions warrant, so that if for no other reason, railroad wages in each particular section of the country can be brought in direct conformity with prevailing scales of pay for analogous occupations in those particular localities, and similarly with reference to the cost of living in corresponding communities.

The differences in all the elements entering into the situation, whether cost of living, rates of pay in outside industries, general social conditions, etc., are so pronounced as between different portions of even distinct sections of the country; as for instance, within the New England district, within states themselves, and as between rural and urban communities on individual railroads;

that to pay the same scales of wages and apply the same working conditions results directly in discrimination between the employees working in these different places. The standardization of wages for all classes of railroad employees which disregards such local conditions is a serious violation of economic law, and the continuation of such policy would be in violation of the Transportation Act of 1920. The attempts in the past few years to standardize wages over the entire country, when the conditions over the entire country are not and could not, and, in fact, should not be standardized, is a contributing factor to the present situation which is resulting in criticisms of the expenses of the railroads and the quite general conception that there is wastefulness in the expenditures of the railroads, and, therefore, the shippers are being required to pay traffic rates unnecessarily. This experience has also demonstrated that payment of standard railroad wages to all employees is reflected in the wages paid by outside industries and on the farms, all of which contributes to the high cost of living.

It is felt that not only on the railroads but as between the railroads and the commercial industries, economic peace cannot obtain under the existing standardized rates for all classes in disregard of the local conditions as to cost of living, rates paid in outside industries, social conditions, etc., as before referred to, and the eastern railroads are anxious and ready to do all within their power to correct this situation in conformity with the provisions of the Transportation Act of 1920.

In addition to reductions in the unit or base rate of wages as to which the board has announced its judgment in Decision No. 147, there is involved in the present dispute a proposition not covered or provided for by that decision. The proposition referred to is the substitution of pro-rata pay in place of time and one-half for overtime in freight and yard service. We cannot too strongly and emphatically urge the careful consideration by the board of this feature of the pending dispute. Overtime basis of pay in road freight service was injected into the wage schedules as a pay increase measure, and for that reason, as well as because it directly and substantially affects the amount of the employees' compensation rather than the working conditions under which he labors, the railroads feel that it should be dealt with in this wage adjustment proceeding.

After outlining the history of punitive overtime payments, Mr. Walber continued:

Road freight service provides a dual basis of payment; miles and hours cannot be considered in the same category or comparable with other classes of service or labor which is regulatory on the part of the railroads. The principle of overtime for road freight service on the basis of time and one-half is wrong and inequitable, and cannot be fairly applied where the regulation of hours is beyond the control of the employer. The object of overtime, or rather the establishment of penalty rates of pay after a stipulated number of hours of service is a restrictive feature instituted for the purpose of limiting the individual hours of service for what might be termed "stationary employment" where an equitable return is obtained and the duration of service is governable by the employer. The emergencies of road service, involving uncontrollable features which are non-regulatory on the part of the carrier and which it cannot control, separates this class of service from all others, as the railroad has no means of obtaining a proper equivalent. In real service it is quite evident that in many cases neither the management nor the men can prevent overtime. Weather conditions, density of traffic, unexpected breakdowns at points lacking facilities for prompt repairs, may either singly or together cause delays to such an extent that a run which under reasonable conditions takes eight hours, may be protracted to twelve hours. In such cases, the crew is not called upon to perform fifty per cent more labor, as would be the case in a shop, but is required to spend fifty per cent more time in performing the same amount of labor.

After outlining the further development of punitive overtime payments to engine and train service employees during federal control, and quoting Director General Walker D. Hines with respect to his attitude toward these payments, Mr. Walber continued:

It will be observed that the Director General plainly stated that he could not approve of the granting of time and one-half

for overtime on the basis for which it had heretofore been contended, his views coinciding with those of the arbitration boards which had passed upon the subject, and also with those of the railroad managements who are unable to see any justification for the granting of such a penalty measure applying to conditions which are almost entirely beyond the control of the managements or the men themselves.

This attitude of the Director General was brought to the attention of the board in the hearings involving the wage scales, which resulted in Decision No. 2. The contention of the railroad managements that the increased pay resulting from the granting of time and one-half for overtime, which the Director General treated as a wage adjustment in his memorandum, was evidently ignored by the board in rendering Decision No. 2, as we construe the increases granted, which were the same number of cents per hour as were granted other classes of skilled employees, and in that way granting disproportionate increases to the engine and train service employees as compared with other classes. Therefore, all such classes having been treated equally with reference to the amount of increases per hour or per day, in the basis rates, with no consideration whatever of the dual basis of pay applicable to the men in road freight service, we believe we are fully justified in the conviction that the reasons which influenced the Director General in making this concession no longer exist and have been wiped out by the action of the Labor Board in the promulgation of the increases under Decision No. 2.

J. W. Higgins Testifies for Western Roads

Mr. Walber was followed on the stand by J. W. Higgins, executive secretary of the Association of Western Railways, who spoke on behalf of the western carriers. Mr. Higgins said that despite the recent wage cut of \$400,000,000 in the pay of railway employees, western railroads will continue to stand squarely upon their requests for reductions in wages which will restore the rates of pay in effect prior to the last increase of \$700,000,000 ordered by the Railroad Labor Board last July. "The evidence now before the board shows conclusively that the grounds upon which the last increase was made have entirely disappeared by reason of changed circumstances and conditions affecting the cost of living and the rates of pay for work of the same character in outside industries," Mr. Higgins said in outlining the carriers' position.

"The western carriers," he said, "notwithstanding Decision No. 147 which established decreases in rates of pay that are less in amount than those which these carriers have asked this board to establish and which it is asserted are justified upon the records in this proceeding, stand squarely upon and adhere to the prayers in the applications which have been filed for reductions in wages and rates of pay that will restore the wage schedules of these carriers to the basis not in excess of the wages and rates of pay which obtained before the promulgation of Decision No. 2."

Frank H. Alfred, president of the Pere Marquette; F. W. Sargent, general solicitor of the Chicago & North Western; J. J. O'Neill, general manager of the Chicago, St. Paul, Minneapolis & Omaha; J. L. Coleman, general attorney of the Atchison, Topeka & Santa Fe, and G. S. Waid, general manager of the Southern Pacific lines in Texas and Louisiana, also testified for their respective roads, reiterating, to a large extent, the arguments made in the previous hearings regarding the cost of living and the wages being paid for similar work in outside industries. All asked for the restoration of the rates of pay in effect prior to Decision No. 2.

J. G. Walber Presents Additional Exhibits

Mr. Walber, on behalf of all of the carriers, submitted numerous exhibits regarding the cost of living and the wages being paid in outside industries for work similar to that performed by the railway employees. These exhibits showed in general that the cost of living has decreased approximately 5 per cent since the filing of similar exhibits with the board in the wage hearings just ended. One of these exhibits, for instance, showed that the cost of living in May, 1921, is approximately 41 per cent lower than it was in July, 1920, when the peak was reached. Wholesale prices are shown in

other exhibits to have decreased from 5 to 13 per cent since February and it is necessary, according to Mr. Walber, to go back to 1915 and 1916 to find comparable periods.

Regarding the relation of wholesale prices to the cost of living, Mr. Walber called attention to the fact that the Bureau of Railway Economics, which prepared the exhibits, mentions the tendency of retail prices to lag behind wholesale prices.

"We feel that your board is thoroughly alive to the conditions which generally exist with reference to this feature in our industrial situation," Mr. Walber said in explanation. "It is common knowledge that this situation is receiving attention in various ways; press dispatches indicate that the administration at Washington is taking an active interest in the matter of reducing retail prices. We confidently believe that there will be a continued decline in all the elements entering into the cost of living; also that wholesale prices have not reached as low a plane as they will and that there will be a gradual drawing together with the lines of decline of the retail and wholesale prices. In any event, as wholesale prices are steadily declining, the downward movement in retail prices will continue for a much longer period of time."

The railroads completed their pleas for wage reductions on June 7, the remainder of the western roads outlining their requests and the reasons therefor, and Dr. C. P. Neill taking up the arguments in behalf of the southeastern roads. The afternoon session was opened with a controversy between B. M. Jewell, president of the Railway Employees Department of the American Federation of Labor and representatives of the Pullman Company over the right of that company to bring its case for wage reductions before the Board at this time. Mr. Jewell contended that the Pullman Company has had no conferences with "the authorized representatives of the employees" in accordance with the terms of the Transportation Act. The action of the Pullman Company in bringing the case before the Board was defended by G. S. Fernald, counsel, who stated that Mr. Jewell's objections were purely technical. Chairman R. M. Barton of the Board, ruled that the pleas of the Pullman Company for wage reductions would not be heard until the Board had decided the question of jurisdiction.

Representatives of the various classes of employees involved in the wage controversy testified at the afternoon session, all of them stating that they are resting their cases upon the testimony introduced in the recent wage hearings.

Intimations that the attitude of employees in engine and train service was such that their acceptance of wage cuts at this time was not probable were made before the Labor Board on June 8 by L. E. Sheppard and W. G. Lee speaking on behalf of employees in Group I. Mr. Sheppard outlined all the adverse circumstances which might act to influence representatives of the employees in Group I to vote for rejection of the decreased rates of pay fixed by the Labor Board last week when the general chairman of all the carriers affected met at Chicago on July 1. No specific threats were made, both Mr. Sheppard and Mr. Lee confining their remarks to outlining the probable frame of mind of these employees and stating that if a strike was called blame would lie first with railroads in trying to reduce wages at this time and second with Labor Board in ordering decreases. Mr. Sheppard defended the position of the conductors, whom he directly represents, by stating that discrimination in rates of pay which prevailed prior to federal control has merely been continued by awards of the Railroad Administration and Labor Board. "The cost of living," he said, "has never been argued as a factor in wage schedule making and should not be so considered at this time." He also made a vigorous attack on "open shop" propaganda and in closing stated that railway employees prefer private control, provided they can obtain concessions under such system as they obtained while railroads were under federal control.

Mr. Lee's arguments were based largely upon the statement that the Labor Board after rendering one decision could not alter its findings within a few days without the inference being drawn that it admitted error in the first wage cut order. H. P. Daugherty, representing the engineers, and W. S. Carter, representing the Brotherhood of Locomotive Firemen and Enginemen, also testified before the Board, the latter filing voluminous exhibits regarding the regularity of employment of firemen and enginemen, increases in efficiency as measured by traffic handled, hazards of employment and increases in cost of living as compared with wages paid these employees.

President Not Urging General Rate Cut

WASHINGTON, D. C.

PRESIDENT HARDING and the administration are not seeking an immediate general or horizontal reduction in freight rates. The attitude of the President on the subject of rate reductions is now far more closely in accord with that of the railroad officers, the Interstate Commerce Commission and that expressed in the resolutions recently adopted by the National Industrial Traffic League than would be inferred from most of the despatches from Washington to the daily newspapers. There is no warrant for the assumption on which many of the news stories were based that, because the President wants rates reduced as a step toward the "return to normalcy," he is working for a general or percentage cut in rates which would transfer to the shippers most of the \$400,000,000 which it is estimated the railroads will save in wages during the next year, and that he has been urging such a policy upon the Interstate Commerce Commission.

The President is anxious to have rates reduced and he called on the commission on June 1 to get first-hand information as to what was being done in that direction because of conflicting statements that had been made to him, but he has made no attempt to dictate to the commission in any way and he has since expressed not only surprise and gratification at the progress already made but approval of the course adopted by the commission of working in co-operation with the carriers and the shippers to bring about readjustments of rates where they will do the most good.

Information obtained from commission sources checks with what was given out at the White House regarding the President's conference with the commissioners on June 1; the President also in a later conference with the newspaper correspondents corrected some of the conclusions to which many of them had jumped. The President referred to the evil of horizontal increases or decreases in rates which affect some commodities much more than others because of the difference in the relation between the amount of the rate and the value of the article, in the case of coal for instance as compared with a suit of clothes, and he indicated his entire approval of a readjustment by commodities rather than a general reduction. Incidentally he expressed a rather favorable attitude toward a seasonal reduction in coal rates, such as is proposed by the Frelinghuysen bill now awaiting action in the Senate and which Secretary Hoover has been attempting to bring about by voluntary action of the carriers. The President is interested in this proposal not only from the general standpoint but because the government itself is a large purchaser of coal, but it is understood that railroad officers have expressed an unwillingness to make the experiment.

President Harding's attitude toward the railroad problem has undergone a considerable evolution during the past two or three months, during which he has been consulting on the subject with representatives of all sides of the question. At first he appeared to be convinced that the high rates them-

selves were the principal cause of the railroads' difficulties, instead of the outward and visible manifestation of the high expenses which caused the high rates. In his address to Congress he declared that both rates and the cost of operation must be reduced and possibly he had an idea that it could be done simultaneously. Further investigation of the question showed him that comparatively little could be done toward reducing rates until wages could be reduced and that even then it must be a gradual process. It also showed him that there were many other factors at work of greater importance than the freight rates to cause the business depression. The President was continually receiving complaints from delegations who called upon him or from Congressmen who passed on to him the complaints of their constituents who were being hardest hit by the maintenance of the high level of freight rates while their own prices were being rapidly reduced by the operation of the law of supply and demand.

After various conferences the President began to observe that the complaints of high rates as the term was used generally were actually based on objections to particular rates that had been thrown out of relation to the value of the shipments by the fact that the process of readjustment has been working much more actively in some other directions than it has on railroad expenses. It is likely that the President was particularly impressed with the resolutions adopted by the National Industrial Traffic League at its convention in Cleveland on May 25 and sent to him deprecating "any effort toward a general downward revision of rates until the carriers have had an opportunity to adjust their expenses" and favoring readjustments in conference between carriers and shippers.

As late as May 31 the President had indicated an unwillingness to accept the position of the railroad executives, as it had been reported to him, of general opposition to rate reductions, but apparently he learned later that they had qualified general statements of this character by recognizing the need of many particular adjustments downward. The only information given out at the time of the President's visit to the commission was a memorandum read to the newspaper men at the White House, to the effect that the President had gone to inquire of the commission what progress was being made and that he was gratified to learn of the extent of the readjustments from the general percentage advance that had already been made.

It gives more punch to a newspaper story to picture the President of the United States as an all-powerful boss whose expression of a desire means that he proposes to "start something" than to represent him as a layman seeking information on a somewhat technical subject. Therefore, the President's repeated statements that rate-making is a legislative function delegated by Congress to a commission, rather than a legislative function, and that the present Executive is not inclined to go over the heads of the duly constituted authorities, have either been ascribed to a becoming modesty or subordinated to the interest of dramatic journalism.

The President has been a newspaper editor and publisher, but, to apply a newspaper analogy to his present office and to treat his cabinet as a staff of reporters who are supposed to keep the chief informed as to what is going on, it may be stated that the staff does not include any man assigned to the railroad run. When the President asks his advisers what is doing in their departments that is of general interest there is no one to talk for the railroad business. It is understood that the railroad problem was first brought before the cabinet by the Vice-President because none of the other cabinet officers has any jurisdiction over transportation, but there are men who are somewhat interested in railroad matters and who have heard mild rumors from their friends, the farmers or the manufacturers, that they are not making as much money as they ought to or would like to and if it did not cost so much to transport their products from the places where

they grow or are made to the places where they are worth something they might make more money. Although prices are not regulated it occasionally occurs to the producer that his government has the power to regulate freight rates.

As a result, when Managing Editor Harding holds his semi-weekly staff meetings, his agricultural department editor or his commercial editor may remark that he understands that freight rates are very high, that something ought to be done about it and that as far as he can see nothing is being done about it. Having no member of his staff assigned to cover the Interstate Commerce Commission, Editor Harding decided to go out one fine morning and interview the commission itself. The bulletin he issued on his return indicates that he thought he had dug up a good story and it is said that he expressed some surprise that he had been able to land something like a scoop as a reward for his enterprise in going after both sides of the story.

The commissioners told him that for months they had been working in co-operation with the railroads and the shippers in correcting inequalities that had resulted from the latest percentage increase in freight rates and that several important reductions in rates on particular commodities had been

criticism on the part of those who do not share such feeling on the ground that it has tended to cause many people to hold off buying and thus delay the readjustment.

Freight Car Surplus Continues to Decrease

WASHINGTON, D. C.

THE NUMBER of surplus freight cars for the week ending May 31, as compiled by the Car Service Division of the American Railway Association, shows a further decrease to 394,040, or about 28,000 less than for the previous week. Of the total 155,040 were box cars as compared with 168,272 the week before, and 165,102 were coal cars as compared with 176,442 the week before. The freight car loading also continues to increase, but the compilation of the report for the last week in May was delayed until too late for publication in this week's issue.

The summary of car loading for the week ended May 21 is given in the following table.

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS; COMPARISONS OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. FOR WEEK ENDED SATURDAY, MAY 21, 1921

										Total revenue freight loaded		Received from connections			
		Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Merchandise L.C.L.	Miscellaneous	Corresponding	Corresponding	This year 1921	Corresponding year 1920	Corresponding year 1919	
Districts:	Year									This year 1921	year 1920				year 1919
Eastern	1921	6,151	2,668	42,076	1,125	5,446	2,768	57,963	69,711	187,908	199,939	191,417	199,540	238,518	204,396
	1920	4,823	2,824	47,848	2,899	7,106	6,515	35,089	92,835	160,251	182,041	164,799	109,481	138,436	122,780
Allegheny	1921	2,713	2,596	50,081	2,566	2,386	6,496	43,631	49,782	33,814	32,770	34,261	13,136	21,486	17,523
	1920	2,180	2,655	50,176	6,044	3,264	7,748	38,729	71,245	112,029	125,058	112,451	61,691	83,695	61,714
Pocahontas	1921	155	115	24,365	31	1,354	40	2,614	5,140	112,067	144,624	125,008	40,650	61,241	51,771
	1920	145	96	18,559	610	2,374	291	168	10,527	112,067	144,624	125,008	39,943	70,905	56,980
Southern	1921	4,190	1,964	19,476	584	15,198	764	38,216	31,637	112,029	115,434	99,349	44,528	52,304	42,715
	1920	3,134	2,101	21,248	52	19,070	3,100	25,245	51,108	112,067	144,624	125,008	40,650	61,241	51,771
Northwestern	1921	8,210	6,783	4,284	700	15,282	18,725	27,178	30,905	112,067	144,624	125,008	40,650	61,241	51,771
	1920	8,677	7,652	6,763	1,072	17,821	37,919	21,408	43,312	112,067	144,624	125,008	40,650	61,241	51,771
Central Western	1921	10,615	9,464	14,200	192	4,278	573	30,250	32,961	102,533	115,434	99,349	39,943	70,905	56,980
	1920	9,303	10,369	18,607	422	5,685	3,083	23,244	45,721	112,067	144,624	125,008	40,650	61,241	51,771
Southwestern	1921	5,218	2,778	4,030	139	6,272	848	16,178	24,265	59,728	62,208	50,039	44,528	52,304	42,715
	1920	4,054	2,507	5,848	136	6,906	612	16,126	26,019	62,208	62,208	50,039	44,528	52,304	42,715
Total, all roads...	1921	37,252	26,368	158,512	5,337	50,216	30,214	216,030	244,401	768,330	862,074	800,960	508,969	666,585	557,879
	1920	31,316	28,204	169,049	11,235	62,226	59,268	160,009	340,767	768,330	862,074	800,960	508,969	666,585	557,879
	1919	32,863	30,309	169,902	.....	55,431	46,386	.....	442,433	.....	777,324	.....	.....	.....	.....
Increase compared	1920	5,936	.....	.....	.....	.....	.....	56,021	.....	.....	.....	.....	.....	.....	.....
Decrease compared	1920	.....	1,836	10,537	5,898	12,010	29,054	.....	96,366	93,744	.....	.....	157,616	.....	.....
Increase compared	1919	4,389	.....	.....	5,337	.....	.....	216,030	.....	.....	.....	.....	.....	.....	.....
Decrease compared	1919	.....	3,941	11,390	.....	5,215	16,172	.....	198,032	8,994	.....	.....	48,910	.....	.....

L.C.L. merchandise loading figures for 1921 and 1920 are not comparable as some roads are not able to separate their L.C.L. freight and miscellaneous of 1920. Add merchandise and miscellaneous columns to get a fair comparison.

May 14	1921	34,418	25,599	161,782	5,126	49,365	22,806	215,524	235,538	750,158	843,145	739,945	501,228	620,196	540,955
May 7	1921	34,847	27,123	143,323	4,626	48,095	13,041	213,535	233,435	718,025	843,184	753,287	494,405	586,667	549,712
April 30	1921	34,426	29,909	145,010	4,659	48,554	7,725	213,792	237,922	721,997	800,960	752,362	489,073	545,205	554,350
April 23	1921	32,715	29,602	138,576	4,595	46,711	5,691	211,627	235,010	704,527	717,772	715,042	486,040	426,958	521,991

worked out and more were in process of being worked out. They may have told him also that the \$400,000,000 wage reduction would not be all velvet for the railroads, that a considerable part of it is needed merely to avert bankruptcy, that even if it could all be applied to rate reductions a 10 per cent horizontal reduction in freight rates would hardly persuade many people to buy in much larger quantities than they are now buying, while it would certainly reduce by that much the revenues on the business that is moving anyway, while a larger reduction on some commodities might stimulate some business to be handled in otherwise empty cars.

As a newspaper man, Mr. Harding may also have been reminded that the thousands of rate adjustments already made have naturally attracted little publicity individually, while those who have been complaining about high rates have naturally made more noise than those who have not been complaining.

The effect of the Presidents' various statements to the newspaper correspondents, however, has undoubtedly had a tendency to encourage a feeling throughout the country that freight rates were due for a fall and there has been much



Central Station, Copenhagen, Denmark

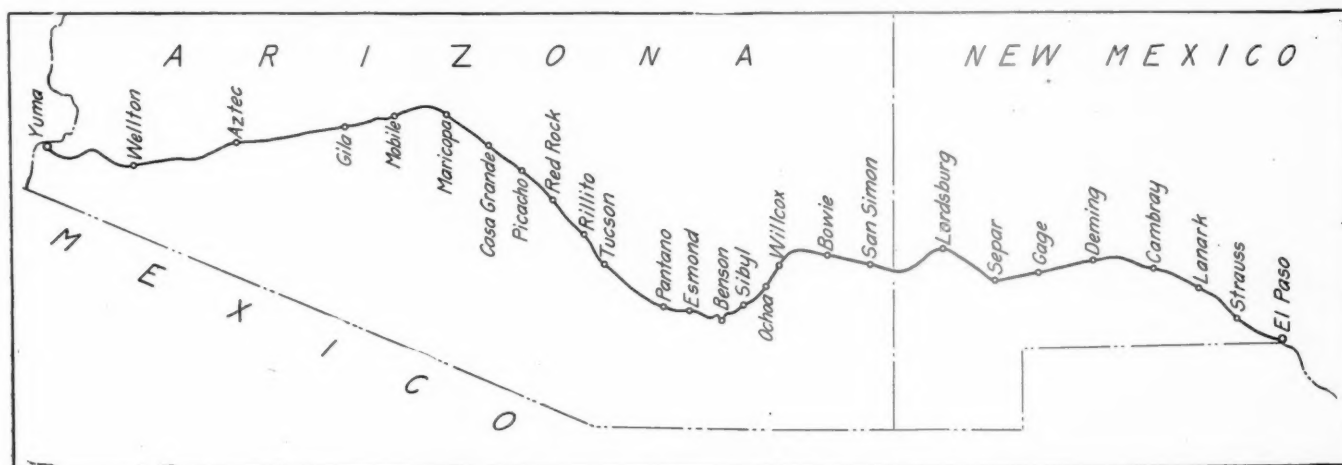
Traffic Troubles Reduced by Enlarging Water Supply

Southern Pacific Effects Annual Saving of \$104,000 by Organizing Systematic Campaign on Tucson Division

THE CONDITIONS on the Tucson division of the Southern Pacific practically from the time the division was opened for operation have borne constant testimony to the extra importance that should be attached to the item of water supply as a factor in train movements through comparatively arid sections of the country. This division extending from Yuma, Ariz., to a point near El Paso, Tex., includes 564 miles of main line, all of which is through desert. The character of this territory is such that in constructing the line in 1879 and 1880, one of the largest items of expense was that of hauling and transporting water for the work. In fact, it was a common belief of the men in charge that no water was to be had in that section. As a result of this belief, together with the urgent need of hurrying the construction in order to effect a connection between the Pacific and Atlantic, the water supplies developed were unsatisfactory, even at that time. However, with but little improvement they remained the only ones until 1917, when it was decided to attempt a substantial improvement. This plan was precipitated by the events of the preceding year when, as a result of large in-

it available for boiler use in order to effect a settlement of the mud. The breaking down of the machinery was a frequent cause of trouble, there being but the one pumping unit. Also freight traffic regularly experienced delays incident to the preference given to passenger movements, there being five passenger trains in each direction daily, all of which carried water cars and which in themselves often encountered conditions at Yuma where it became necessary to obtain their supply of water from the small mains of the city. The change made was that of drilling two wells, one 246 ft. and the other 252 ft. deep and installing two electrically operated Lane & Bowler turbine pumps. The water, though not of the best quality, is present in ample quantity for all purposes.

Having corrected the trouble at Yuma, attention was directed to the situation at Wellton, 37 miles east. The trouble here was not so much one of inadequacy of supply as excessive cost of operation, the supply here in many instances having been carried over the entire freight division from Yuma to Gila, a distance of 123 miles, over a period when



Map of Southern Pacific Showing Water Stations on Tucson Division

creases in the tonnage on the Pacific coast and through the Imperial Valley of California, conditions were aggravated to a point where substantial relief seemed essential. Annoying delays incident to a shortage of water at stations or to their distance apart, and more or less costly maneuvering to make the best of a bad situation were every-day occurrences, while train failures and blockades, though less common, were not unknown. The condition was partially met by hauling water cars a distance of 400 miles, oil tank cars being used for the purpose, but this was an expensive practice, each water car decreasing the capacity of a train for revenue freight by one car and there being a demand at all times for cars capable of transporting oil.

Program for Better Water Supply Begun at Yuma

The plan of relief called for the establishment of water stations on the Tucson division at intervals of 25 miles. Predictions of failure were plentiful but the work was undertaken and a beginning made at Yuma, the west end of the division. It had been the practice here to secure water from the Colorado river, pumping it into large concrete settling tanks and confining it therein for 12 hours prior to making

other wells had been pumped dry or rendered inoperative by machinery failures. The employment of three pumpers at this point, however, was a matter which invited improvement. To the end of effecting such an improvement, two Lane & Bowler pumps, belt-driven by two gas engines, were installed with the result that one attendant now handles the work. The saving effected by this change exceeds \$3,000 annually in pumpers' salaries alone. The quality of the Wellton water, however, is the poorest on the division. It contains 26.59 grains per gallon of incrusting salt and 53.42 grains per gallon of non-incrusting matter, the total dissolved matter being 80.01 grains per gallon.

The one unfavorable condition now outstanding on the freight division between Yuma and Gila was that of operating trains between Wellton and Sentinel. With a distance of 50 miles between these stations, it happened at times that trains attempting to operate over the district on the supply of water carried in the engine tender would run short before reaching Sentinel and experience serious delay on that account. To overcome this condition, water was prospected for at Aztec. Although an unlikely place for water from all surface indications, Aztec being one of the most desolate

spots on this route, efforts at drilling were successful, the installation at this point consisting of two wells, 710 ft. deep, two gas engine driven Lane & Bowler pumps and a 350,000 gal. steel tank.

Wells 1,746 Ft. Deep at Gila

The situation at Gila was one of inadequacy and, being a terminal point, it was especially urgent that the trouble be overcome. Although there were two wells at this point, the supply would become exhausted during periods of heavy business and necessitate the hauling of water from Wellton, 85 miles west, and from Maricopa, 42 miles east. The problem of supply was solved by digging deeper, a seemingly inexhaustible supply being found at a depth of 1,746 feet.

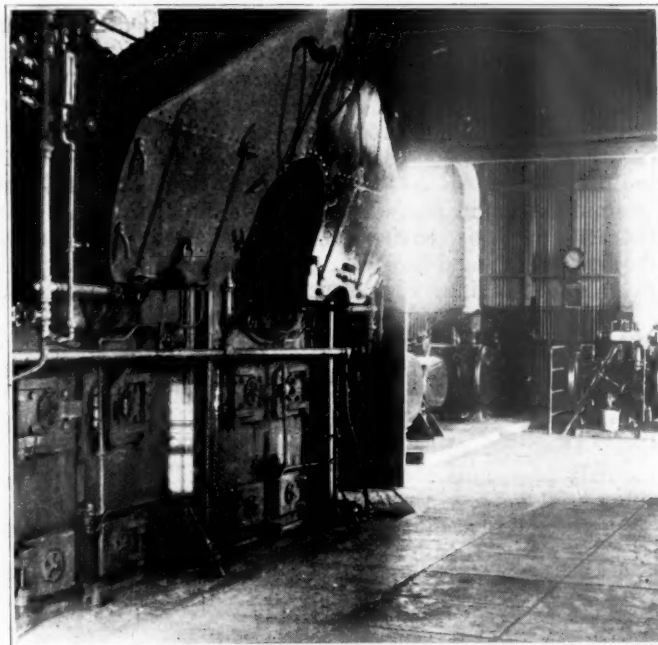
This water, however, like that at Sentinel has a temperature of 110 deg. F., a temperature at which locomotive injectors experience difficulty in picking up the water. A cooling device which has been installed serves a beneficial purpose during most of the year, but considerable trouble from this source is experienced in extreme hot weather. The pumping installation is an air lift system, the air being supplied by two Ingersoll-Rand Imperial air compressors.

The next water station eastward was located at Maricopa, 42 miles from Gila. Twenty-two miles of this distance is up a 1.5 per cent grade, necessitating the hauling of water cars in both directions. In order to overcome this difficulty a search for water was made at Mobile, situated about midway between the two stations and a good supply of fair quality water was found at a depth of 451 ft. Since sinking the one well and the installation of a Luitweiler double-acting deep well pump, operated by a 30-hp. gas engine, no necessity has arisen for the hauling of water cars in this section.

At the several water stations between Maricopa and Benson, 136 miles farther east, it developed that as at Gila the solution of the problem was one of digging deeper, the supply not only being more plentiful at the greater depth but of a better quality. At most stations in addition to deepening the wells, the program included the installation of two pumping units to protect the system against machinery failures. In

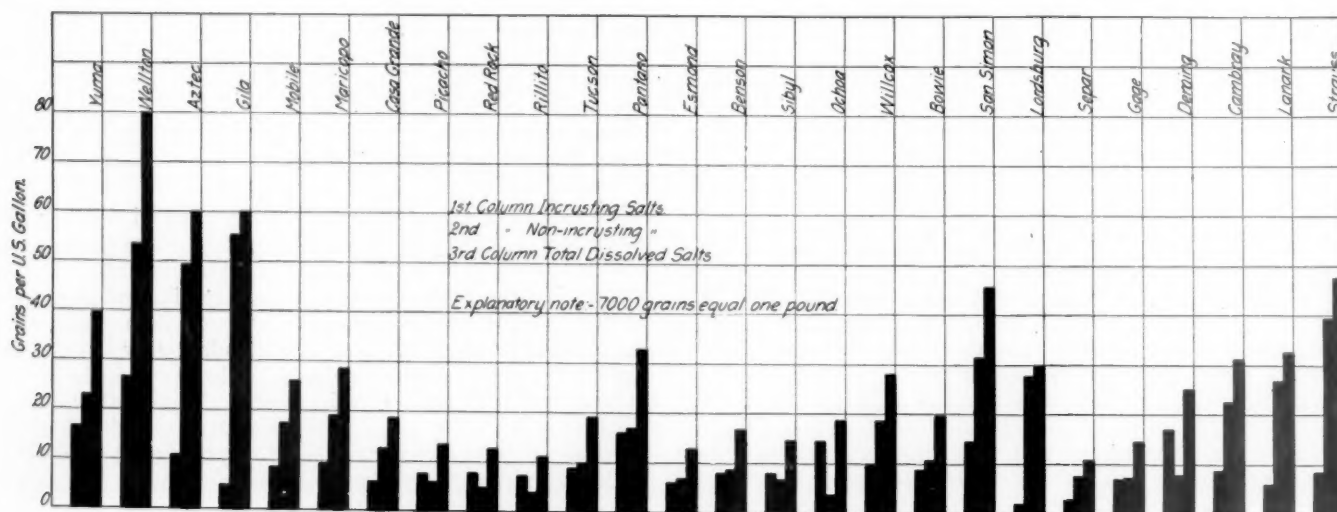
Knowles deep well pumps, supplied by two 80 hp. Pennsylvania type steam boilers.

The likelihood of being able to develop water supplies between Lordsburg, N. M., and El Paso, Tex., a distance of 147 miles, and the only remaining part of the division not yet considered, was considerably less of a certainty than



Interior of Pumping Plant at Bowie, Ariz.

it was at some of the other points. Considerable money had already been spent without success in this region and at one time the hope of obtaining water had been given up entirely. However, judicious prospecting brought in a well at Akela, 81 miles east of Lordsburg, and farther east stations were developed at Afton and Strauss, the plant at Strauss com-



Analyses of Main Line Waters, Tucson Division, Southern Pacific

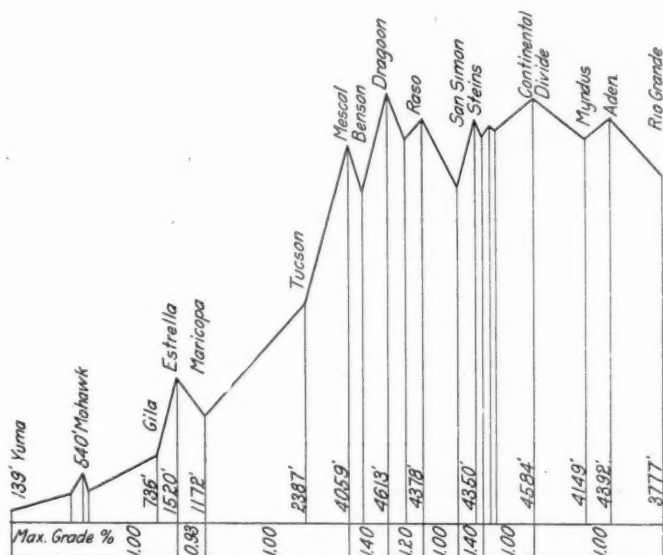
many instances large steel tanks were also erected. A duplicate of the situation between Gila and Maricopa on the west was encountered in eastern Arizona between Benson and Willcox.

The situation at Bowie, Ariz., was another case of insufficient water which simply required deepening of the existing wells, of which there are three. The wells are now 495, 505 and 768 ft. deep, respectively, and are operated by two

prising two wells 975 ft. and 950 ft. deep, respectively, from which the water is pumped by a Sullivan air lift system. Since the establishment of these stations, the need of water cars on this division has apparently been obviated completely.

But it cannot be said that the problems have been altogether overcome. On the contrary, the conditions at some points are still far from ideal. Between Yuma and Tucson, for in-

stance, the quality of the water leaves much to be desired. An engine with new flues will only last about four months in this territory, a condition which is partially met by transferring the engines east of Tucson, where about three months' more service is secured from them. As a matter of fact seven or eight months is the average life of flues in any engine operating through the desert. Also during periods of heavy business it is necessary to hire a great number of enginemen whose experience has been in good water territory and as a result much trouble is encountered in operating the trains until they are able to adapt themselves to the waters. How-



Condensed Profile of the Main Line of the Southern Pacific, Tucson Division

ever, the condition common to the period prior to 1916 and 1917 when an entire division would become blocked and the freight finally backed up to the extent of blocking other divisions owing to the water supplies becoming exhausted at one or two points is now a thing of the past. In 1918 it was estimated that just in avoiding the use of water cars and eliminating the delays which had been incident to their use, a saving of \$104,000 was effected.

We are indebted to Wm. Wilson, division superintendent of the Tucson division, for the information on which the above article is based.

Annual Meeting of the Medical Section

THE first annual meeting of the Medical and Surgical Section of the American Railway Association was held at Hotel Westminster, Boston, Mass., on June 3 and 4, with about 75 representatives in attendance. This was the first full meeting since the Railway Surgeons' Association became a part of the American Railway Association, and the temporary officers were confirmed in their positions for the ensuing year.

The principal business was the discussion of the reports of two committees, one on a sanitary code and one on physical standards for railroad employees. The first-named committee, Dr. R. W. Knox (Southern Pacific), chairman, presented a carefully prepared code of 91 sections, which was adopted for use as standard railway practice. It prescribes rules for transportation of sick persons, cleansing of passenger cars and passenger stations, safeguarding ice and drinking water and hygienic care of construction camps. This code will come before the American Railway Association, at its next meeting, for confirmation.

This code is substantially the same as that which has been approved by the Territorial Health Officers' Association, in which are members from the health boards of practically all of the 48 states; and it also conforms to the standards prescribed in the quarantine regulations of the United States Bureau of Public Health. In connection with the adoption of the code by that Bureau, the railroad surgeons had a number of conferences with the government officers, and the code also has been discussed in former meetings of the railway surgeons; the discussion at Boston, therefore, resulted in no material changes.

The report of the committee on physical standards, Dr. C. W. Hopkins (C. & N. W.) chairman, was in the nature of a progress report embodying conclusions, so far as conclusions were reached in this matter, which were formulated while the railroads were in the hands of the government and which were the subject of a brief report by the Railroad Administration just before the return of the roads to their owners. The committee presented a proposed code of general or preliminary rules, embraced in twelve paragraphs; but because of the short time that the committee has been in existence the subject has not been studied in all its bearings, and the matter of recommendations for action was deferred until a future meeting.

The officers for the ensuing year are as follows: Chairman, D. Z. Dunott (W. M.), Baltimore, Md.; first vice-chairman, G. G. Dowdall (I. C.), Chicago; second vice-chairman, Duncan Eve (N. C. & St. L.), Nashville, Tenn.; third vice-chairman, C. W. Hopkins (C. & N. W.), Chicago; secretary, J. C. Caviston, 30 Vesey street, New York.

Railroads Suffer Heavy Losses in Colorado Floods

By J. B. Day

RAILROADS in Colorado have suffered losses estimated at from \$3,000,000 to \$4,500,000 in the floods which have occurred during the past week. The greatest damage was done at Pueblo on June 3 and 4 and the heaviest



Photo by Underwood & Underwood, N. Y.

Arkansas and Fountain Rivers, Joined by Flood, Washing Away Bridge at Pueblo

losers were the Denver & Rio Grande, the Atchison, Topeka & Santa Fe, the Missouri Pacific and the Colorado & Southern. Other roads which are affected, but to a less degree, are the Union Pacific, the Chicago Rock Island & Pacific and the Chicago, Burlington & Quincy.

Many miles of track have been washed out all over the

state and many bridges large and small have either been washed away entirely or so badly damaged as to require extensive repairs. Rolling stock and shops have been hard hit. On top of the physical damage to the various roads is to be added the loss of revenues resulting at this time from partial paralysis of traffic resulting from the floods, and the loss that is yet to come from shrinkage of tonnage



Photo by Underwood & Underwood, N. Y.

Railroad Yards at Union Station, Pueblo. Two Overturned Passenger Trains

due to ruined crops and the apparent wholesale slaughter of cattle, horses, sheep and hogs indicated by reports from various sections of the state.

It is estimated that there are upwards of 300 freight cars piled up in the Pueblo yards in various stages of destruction. How much of this rolling stock can be salvaged is problematical at this time. Two passenger trains, Denver & Rio Grande Number 3 arriving in Pueblo on the evening



Photo by Underwood & Underwood, N. Y.

Overturned Freight Cars

of June 3 and a Missouri Pacific passenger train on an adjacent track, were caught in the union station yards when the flood descended upon the city and were turned over. The loss of life on the Denver & Rio Grande train was estimated at 23. At this writing the trains are still partly submerged and it is impossible to determine definitely how many of the passengers lost their lives. The union station was in ten feet of water at one stage of the flood and the water was reported to have reached a depth of 15 ft. in the Santa Fe yards.

South of Pueblo and east almost to the Kansas line along the Atchison, Topeka & Santa Fe the flood waters wreaked heavy damage. The Santa Fe shops at La Junta were reported under five feet of water and two locomotives and a large number of freight cars were said to have been destroyed. Near Las Animas two miles of the Santa Fe's track was reported washed out and between four and five miles between Lamar, Colo., and Syracuse, Kans. Of all the lines radiating from Pueblo those leading northward toward Denver were least affected. The Santa Fe expects to have its California line in service by June 12 and its Pueblo line some time next week. The Union Pacific, on its Fort Collins branch, north of Denver, incurred severe losses as a result of washed-out track. The Colorado & Southern lines north of Denver to the coal fields also were badly washed out. The collapse of the main tunnel on the Midland Terminal road completely tying up that line for the time being was reported Tuesday.

With the work of surveying the damage only just begun it is impossible at this date to determine with any great degree of accuracy the extent of the damage done. H. A. Tice, superintendent of the Atchison, Topeka & Santa Fe at Pueblo, is quoted as estimating the probable damage to the property of his company at \$2,000,000 and that of the Missouri Pacific at \$1,000,000. At the headquarters of the Denver & Rio Grande it was said that the most conservative estimate of the physical injury to that road, based on incomplete information, is upwards of \$1,000,000. Robert Rice, vice-president and general manager of the Colorado & Southern, said that a conservative estimate of the damage to the property of his company would be \$200,000.

Electric Power for Railroad Traction

FUTURE EXPANSION in the use of central station power was the subject of an address delivered by Samuel Insull, president of the Commonwealth Edison Company, Chicago, at the forty-fourth convention of the National Electric Light Association recently held in Chicago. The major part of his address dealt with the development of interconnecting power systems and in this relation he said he would like to see every committee of the association watch the progress of any plans of federal control of the power industry. With reference to the railroads Mr. Insull spoke as follows:

"I think we can be of great help in the rehabilitation of steam railroads of this country. I am not one that believes in universal electrical propulsion of railroads immediately. I believe that the economic way to get around to that proposition is to develop our production of energy along economic lines, and to develop the transmission of that energy throughout the country on economic lines; to see to it that we are in a position at any time where electrification of steam railroads is desirable in some particular locality, that we shall be able to take care of it.

"I see no reason why we should not finance that operation right up to the point where our energy is taken by the prime mover of the railroad, that is, the locomotive, and in that respect I think we can be of very great assistance; but in all these investigations—and I have studied some of the figures sent out from Washington—there should be the stabilized knowledge that exists in this industry and in this association and its members as the result of forty years of work in the manufacture of energy. The nation is entitled to the benefit of it, the industries are entitled to the benefit of it, and we are entitled to the benefit of it to the extent that it will stabilize our investment to a greater extent . . . and will help to reduce the cost of electric power and enable us to sell it at cheaper prices to all of our customers. . ."



Meeting of Railway Accounting Officers' Association

Important Action Taken in Favor of Making Portion
of R. A. O. A. Recommendations Mandatory

ADRESSES BY L. F. LOREE, president of the Delaware & Hudson, and by B. H. Meyer, member of the Interstate Commerce Commission, and important action in favor of making mandatory a portion of the recommendations of the Association relative to interline freight, passenger and disbursement accounting, featured the unusually successful thirty-third annual meeting of the Association held at Atlantic City this week. The meeting, which was held at the Hotel Traymore, June 8 to 10, was attended by some 500 accounting officers. The docket which the meeting followed was the largest yet handled at any of the annual meetings of the Association, being double in size over that of 1920. Besides the important steps looking towards making mandatory a portion of the R. A. O. A. recommendations, the meeting also adopted a large number of new forms, the number of such forms presented exclusive of revisions, being equal to that presented in nearly all of the other years of the Association's history combined.

L. F. Loree, president of the Delaware & Hudson, in his

address before the opening session, outlined the uses for which accounting work was done. He emphasized the necessity for having the records made up as promptly as possible and made a plea for greater co-operation between the accounting and other departments. An abstract of his remarks follows:

The Accounting Officer's Work from the Executive's Viewpoint

By L. F. Loree

President, Delaware & Hudson

The system of accounts with which we are concerned is that prescribed by the Interstate Commerce Commission. Its great defect lies in the meticulous detail and the lack of balance. Some of the accounts in the Commission's system involve sums of money so small as to be almost microscopic when compared with the total, while some of the larger items



could be subdivided to advantage. The main source of the trouble would seem to be the attempt to initiate a method of cost accounting on lines similar to those used by a manufacturing plant.

Statistics cannot take the place of judgment, but they are most valuable aids to judgment. They serve as instruments to thought, to knowledge and to work, and should be compiled in the clearest, the briefest and the most compact form. The ramifications of railroad operations are so widespread, the sources of possible wasteful expenditures, or possible economies, so numerous, that if a railroad is to be managed with a maximum of efficiency, it is important that all information bearing on work done and cost of operation be drawn together and tabulated on uniform bases; that is, there should be adequate statistical information. If sufficiently comprehensive, statistics will aid in the solution of problems and enable conclusions to be drawn and judgment matured. Constant usage cultivates a sense of arithmetical values to which the mind becomes responsive in a way analogous to that in which the trained ear becomes responsive to values in harmony.

Statistics should be as few as will cover the essential items and contain the details that explain the fluctuations which have taken place and where they occur. They are exposed to the danger of a careless assumption of data without testing their correctness and to undue refinement in the calculations based thereon. They should be kept so that information can be condensed from period to period on statements that will enable comparison of cumulative periods, and they should be brought together in folders. Much of the beneficial effects to be derived from their use is now lost through their being scattered over numerous sheets and a failure to draw them together.

Greater Use of Diagrams Suggested

The use of diagrams is very helpful and they may be drawn to illustrate many statements, bringing in a very direct way material facts into prominent notice. The changes stand out and save much mental labor in carrying in mind a long series of figures, and the appeal to the memory is, in some ways, more intense. Great care must be exercised in the choice of scales and illustrations for the diagrams, while the use of colors is frequently advantageous to give emphasis or direct attention to the significant facts.

It is important to keep in mind that we have two classes of statistics for measuring efficiency—financial and physical. Much more should be done than has been done by the accounting department in the developing of physical statistics. Such statistics have the great advantage that the units used are constant and not subject to the fluctuations entailed by changes in wages and prices, while they have the advantage of familiarity and close personal association.

The lawyers have a saying "time is of the essence of the contract." Time is of the essence of all statistical data. It may well be that a statistic available on the 4th of the month will have four times the value of the same statistic not furnished until the 20th. Careful study should be made of the dates upon which statistical data are to become available and resolute discipline imposed to produce them on time.

INTIMACY WITH OTHER DEPARTMENTS SOMETIMES LACKING

There is an intimacy in the relationship of the auditor and his accountants with the other departments of the railroad service which is much more direct and pervasive than are the relationships between one and another of the other department chiefs, and his work carries with it a penetration into the several departments that is quite distinctive. On the other hand, the personal and official intimacy that exists between the other departments is singularly lacking in the relationship between the auditor and his accountants and

the officers and employees of the other departments. It is very much to the interest of the railroad properties that this situation, which is in some respects harmful, should be corrected, and it cannot be corrected unless the reasons for it are understood and the proper means to overcome it known.

In the early days of railroading the jurisdiction of the average officer was so limited, and the details with which he had to deal were so comparatively few, that he was to a very large extent able to do his own accounting. A generation ago railroad accounting was a simple matter. As division engineer, I had a "road and bridge material" clerk but I made out the payrolls, handled the correspondence and the rest of the office duties myself. As the business developed and grew, this was no longer possible and the entire accounting of the railroads was drafted into one department. Today the work is most elaborate and is only gotten through with by the aid of much office machinery. Beyond question the change in the practice was not only desirable but unavoidable. To a considerable extent the irritation on the part of the operating officer is a natural consequence, due to the loss of control over work that was until lately under his jurisdiction. It is a natural resultant of the transitional period. What should be done is to make the change as agreeable and as promptly as possible.

A further reason for the existing disharmony is the lack of acquaintance and familiarity of both sets of officers with the problems and difficulties of their associates. In the two great maintenance departments the problems presented involve an acquaintance with mathematics and the laws of physics, which form the basis of the technical education of the officers employed in each, so that the tools they use and their habit of mind are alike, making easy the comprehension on the part of one of the work of the other and the various aspects in which it presents itself. Not to so great an extent, but measurably so, this is also true between the two maintenance departments and the transportation department. The division engineer, in arranging for his ballasting, distribution of ties and rails, putting in new bridges and many other activities, is compelled to consult the train schedules and reconcile his interests with those of the transportation officer, and, similarly the transportation officer has to modify his own movements to meet these demands and is led to consider them in detail and familiarize himself with them. Thus these officers come to have the same intellectual outlook and to speak the same language; they have a common stock of experience and understand each other when they exchange ideas.

ATTITUDE OF I. C. C.

There is no such relationship between the officers of the accounting department and those of the other departments. Bookkeeping is to the average operating officer an esoteric mystery with which he is not in the way of becoming familiar unless he deliberately acquires a new, highly technical and difficult art. On the other hand, the accounting staff has neither the foundation of the technical training nor the experience of transportation movements that make a base from which they can build up a body of knowledge. Much attention will have to be given to broadening the field of knowledge of both parties. The situation, with these inherent and initial disadvantages, accentuated by the changing conditions, is further disturbed by the Interstate Commerce Commission. In putting into effect the accounting rules made effective by the commission on July 1, 1907, its statistician, Henry C. Adams, called together the accounting staff of the commission, and, among other things, said to them:

The government has recently undertaken to do something quite different from that which it has ever undertaken to do before. It has undertaken to exercise a controlling influence upon the administration of railway properties through the agency of their accounts.

The aim of the supervision of accounting is to exercise influence upon the administration and management of railway property.

Not only was this attitude assumed but a provision of the law was taken advantage of to promulgate the idea that the auditor is not so much an officer of the railroad company as he is a responsible officer of the government, and that failure to obey the instructions of the commission might lead to his fine or imprisonment. It would be, perhaps, too much to say that railroad operations can be controlled through the accounts. That would be to make the history of the fact the actuating force bringing the facts into existence. In railroad practice, time, space and matter cannot be made to assume these relations, whatever we may think of Einstein's theory of relativity.

It is needless to say that the attitude of the railroad executive was heartily opposed to this assumption of power, both in letter and in spirit. Mr. Adams went on further in his remarks to say:

I do not know whether what I have said was consciously recognized by the members of the Interstate Commerce Commission when they framed the order under which the operating accounts were promulgated.

Happily, the commission took much the same view of the matter as was taken by the railroad executives and sought to use its powers in the regulation of the carriers rather than in the management of their business. Notwithstanding this, much harm was done, and still to too great an extent the attitude of individual members of the staff of the Commission is in this direction.

It is of the very first importance, if I rightly apprehend the situation, that we, every one, set ourselves resolutely to work to put all these matters in their right relation; and I, myself, think few things are more important, looking to the improvement of railroad practice and the success of the transportation interests from the standpoint both of the public and the owners. As a means to this end, I believe every opportunity should be taken to bring the officers into personal contact—on inspection trips, at staff meetings, at the meetings of the technical organizations—in short, wherever opportunity offers. Much more important than this is the avoidance wherever possible of letter-writing and the substitution therefor of the warmth and sympathy of personal explanation. It might quite well be that this would have the appearance of adding to the work of people already over-taxed, but I am satisfied it would shortly have the effect of materially reducing the volume of the work. Whether this were so or not, it would be, in my opinion, the most effective way of correcting the conditions to which I have alluded.

It is inevitable that with the continued growth of the volume and complexity of the business, the work of the auditor should grow in authority, influence and usefulness.

We who are in a position to influence this growth should be foresighted, diligent and patient in working out the details and fitting them into place, and especially in encouraging and forming those personal relations that will so powerfully aid in their final success.

Some Criticisms and Suggestions

By B. H. Meyer

Member, Interstate Commerce Commission

There never has been a time when the profession which you represent has been more vital to the transportation interests of the country than at present. Without your work the proper conduct of the railroad business from a company standpoint and the performance of the duties of regulatory bodies would be impossible.

New accounts have been set up and old ones modified to meet new requirements of law and of practical operation.

Changes are not always welcome. The decisive test whether or not to make a change lies in the public interest connected with it. The decision, however, can not be made solely from the standpoint of the apparent public interest, because there are a good many things which public interest in a certain sense might seem to require but which do not promise sufficient public and private benefit to warrant the expenditure of the sums necessary to put the proposed changes into operation. To a large extent public and private benefit from improved accounts and statistics coincide. Where the public interest is clearly controlling even the absence of private benefit in the narrower sense of the word may not stand in the way of doing that which the larger public interest requires. There are many interesting things which accounts and the statistics based thereon could readily furnish; but interest alone is not an adequate test. There must exist a dominant public consideration for the requirement. From my official standpoint, changes in accounting and statistical requirements find their justification in the necessities of the proper administration of the laws with the execution of which the Interstate Commerce Commission has been charged by Congress. We have sometimes been requested to require the compilation of statistics thought to be useful to cities and other political units in government, as well as private commercial bodies. Personally, I should not feel justified in extending accounting and statistical requirements of railroads into such fields until Congress has specifically authorized us to do so.

Comparability Lost by Changes

An objection that has frequently been raised against the making of changes in railroad accounts and statistics is that comparability will be destroyed. Comparability has been destroyed or made more difficult as a result of certain changes which have heretofore been made in the form of accounts and statistics, and in the period of time for which they are made. This is a loss which could not be avoided. Comparability is not an end in itself. Public necessity is. Comparability should be preserved to the fullest extent possible, but the mere fact that proposed changes will make comparability more difficult or impossible should not weigh heavily against changes which public interest and efficient company management may require.

Public interest dominated the original formulation and subsequent elaboration of the uniform system of accounts. The principles which these accounts exemplify will in all probability be incorporated in the accounts which may be required in the near future by statute of what are now essentially unregulated private industries. The same considerations which gave rise to public regulation of railroads will usher in an epoch of public regulation of hitherto essentially private industries in certain of the respects in which private industry has not heretofore been regulated. I do not expect this development of public regulation to cover the entire field of industry at once. It will probably begin with relatively few large basal industries, in which the public element has become dominant and the names of which lie in everybody's mind who has had to deal with railroads during the last decade. I believe when that time comes it will be found that the work you have done and the experience which you have accumulated will provide a foundation and a guide in the initial steps of control of price of the products in question. The consolidation authorized by the transportation act may promote this movement.

The Separation of Expenses

When the time comes that general reductions in rates may be seriously considered, one question which will again present itself, and which demands an intelligent answer is whether such reductions as may be warranted shall be made horizontally, covering all traffic, or whether certain commodities or

classes of traffic shall take precedence over others in the downward trend. When we were considering the rate increases of 1920 in Ex Parte 74 this question was presented to us. During the earlier stages of that proceeding it had been suggested that passenger fares, for instance, should not be increased at all, and that the entire burden of providing the increased revenues should fall upon the freight business. That was before the wage awards of the summer of 1920 had been announced. Such figures as were then available indicated that the passenger traffic was at that time yielding a somewhat higher rate of return than the freight traffic. On that state of fact I should have opposed any increase in passenger fares. Until Congress directs otherwise, I shall be unwilling through my official acts to cause passengers to travel substantially at the expense of those who ship freight, or freight transported at the expense of people who travel. Within practicable limits each branch of the business should carry its fair share of the total burden.

Those of you who were members of the joint committees of 1907 will remember that at that time I tried in every way possible to incorporate into the then proposed uniform accounts the basis for this fundamental principle. Happily, we shall soon be in a position where basic data will be available, in fact to a limited extent they are now available, which will enable those charged with that responsibility to say within practicable limits what the rates of return on the passenger and freight services respectively are and should be. It is not for any one except the individual citizen to say who shall and who shall not travel; and yet the contrary would result were some of the views suggested in the record in Ex Parte 74 to prevail. Some seemed to think that no travel except their own was really necessary. The encouragement or discouragement of traveling is a matter of public policy respecting which Congress has not specifically legislated, except to a limited extent, and within the scope of such legislative action we must perform our duties. In the performance of these duties the accounts relating to the separation of expenses between the different branches of the business are indispensable, as they are likewise fundamental for a more detailed development of what is generally discussed under the caption of cost accounting and efficiency.

The Severest Professional Tests

In the administration of section 210 of the transportation act which provides the so-called revolving loan fund of three hundred millions of dollars, we have given much consideration to the earning capacity and probable earnings of the applicant carriers. One of the findings which we are required to make as a prerequisite for the making of a loan is that the applicant has furnished reasonable assurance of its ability to repay the loan within the time fixed therefor. In making up statements of probable earnings, the temptation may present itself to overstate past earnings and estimates of future earnings; and the more doubtful the case the greater perhaps the temptation. On the other hand, when increases in rates are asked for, a temptation in the opposite direction to overstate expenses and underestimate the revenues may be met. Accounts covering the guaranty period present their own inherent difficulties and invitations to be adaptable and elastic in the interpretation of rules and regulations are not wanting. Situations of this kind subject accountants and statisticians to the severest professional test. The strictest conformity to established accounting rules and regulations must be insisted upon as a matter of public right, professional ethics and personal honor and self respect.

In the thought that you would like to know what peculiarities and defects are noted by those in our organization in whom the multitude of currents from the many outside offices which you represent concentrate, I asked our three Directors of Finance, Accounts and Statistics, respectively,

to note those matters which it might be mutually helpful for me to bring to your attention on this occasion. Before I enumerate the matters mentioned by them, I may remark that, generally speaking, the same character of errors, variations and departures is discoverable in all examinations whether made with reference to section 204, 209 or 20 of the interstate commerce act. As might be expected, the large carriers with greater division of labor, higher specialization and ability to command first-class talent keep their accounts in the best form while the small lines where one man often represents several departments, if not the whole road, encounter the greatest difficulties. However, we have found roads in all classes that have seriously handicapped themselves and us because of the condition of their accounts, in making partial payments, for instance, or final settlements under the most urgent financial needs. Please remember that the law requires us to make determinations, not estimates or guesses. We have made every effort to act with promptness but it is impossible for us to be prompt if we lack vital accounting and statistical information without which we cannot lawfully act.

Accounting Shortcomings That Are

Found by Bureau of Accounts

Director Wylie at my request has kindly enumerated the most common accounting shortcomings disclosed in connection with the work in his bureau (Accounts). Among them are the following:

[Commissioner Meyer discussed in detail each of the following points mentioned, but lack of space prevents the inclusion here of his complete remarks.]

1. Improper credits to revenue account 142, Rents of buildings and other property.
2. Improper apportionment of depreciation in accounting for retirement of equipment.
3. Improper distribution of expenditures incurred in making betterments to equipment and fixed improvements.
4. Improper accounting in connection with facilities not used by accounting carrier jointly with one or more other carriers.
5. Improper accounting in connection with property retired and replaced.
6. Improper entries to profit and loss accounts with respect to items of delayed operating revenues, operating expenses and other income items.

Bureau of Statistics

From Director Lorenz I learn that in spite of the development of adding and computing machines the Bureau of Statistics is compelled to conduct voluminous correspondence with carriers regarding simple clerical errors. The following are among the most frequent of correspondence connected with annual reports:

1. Errors in addition, computing statistical averages, and inconsistency between related entries in various schedules of the report form.
2. Omission of returns in supporting schedules provided for showing detail of entries to certain primary accounts.
3. Improper entries due largely to misinterpretation of texts of the accounts.
4. Failure to complete schedules through omission of data for certain columns, totals, etc.

In our monthly report section, the causes of frequent correspondence have been noted as follows:

1. Changes are frequently made in the monthly figures of revenues or expenses after the report has been filed without noting that fact in the next report. This causes difficulty in making the cumulative figures balance with the preceding months.
2. In connection with the equipment and joint facility accounts, frequent clerical and typographical errors occur as a result of the confusion of net debit and credit balances.
3. There is not apparently a careful check of the consistency of the return before it is mailed. If train-miles exceed locomotive miles, or if revenue ton-miles exceed the

revenue and non-revenue combined, some explanation is called for.

4. We often find that an average for a cumulative period is given as the sum of the averages of the preceding months, instead of being computed for the period. In general, in connection with averages, it may be suggested that a rough check can be made by inspection to see whether the average for the current cumulative period falls between that for the current month and the previous cumulative period.

5. In giving the tons and cost of fuel charged to account 394, care is not always taken to make the tonnage and cost comparable.

Bureau of Finance

Since March 1, 1920, I have been intimately connected with financial matters arising under the transportation act. Our Bureau of Finance is the primary workshop in which all such matters are examined and shaped in the first instance. Many suggestions of an accounting nature have come to my colleagues and me from the multitude of problems which have been presented to us. I have relied upon Director Colston to select those which are among the most worthy to be brought to your attention on this occasion. They are as follows:

Aggregate Value of Railway Property

1. The classifications of investment in road and equipment and of general balance sheet accounts should be so modified or so observed and enforced that the book cost at least of "the aggregate value of the railway property . . . held for and used in the service of transportation" may be readily ascertained. Increased importance is attached to such a requirement not only by the provisions of section 15a with respect to rate fixing and with respect to recapture of excess income, but also by the authority given to the Commission for the regulation of securities under section 20a of the Interstate Commerce Act. The real purpose of any system of accounts being to reflect as nearly as possible the essential facts of a business, the accounts of carriers should show as far as possible:

(a) The facts as to the property upon which either separately or as part of a whole a return is to be allowed, and

(b) The facts of the property as compared with securities supported by and outstanding against that property, distributed between properties held for and used in the service of transportation and properties not so held or used. While it is true that the general instructions governing the classification of investment in road and equipment provide that the accounts prescribed in the classification are designed to show the investment of the carrier in property devoted to transportation service, these accounts, either because of failure to observe this general accounting principle or because of customary interpretation of the term "investment," do not reflect the value of the railway property held for and used in the service of transportation. Specifically, it is quite doubtful and, because of the condition of accounts up to 1907, it may be impossible for the accounts of many carriers to distinguish between the Investment in Road and Equipment and Miscellaneous Physical Property, account 705, as they should. Account 706, Investments in Affiliated Companies, in many cases does not adequately reflect the property held for and used in the service of transportation and represented by this account. For example, where a majority of the stock of subsidiaries is held by an operating company, and these subsidiaries are leased to the controlling line, the total value of the railway property held for and used in the service of transportation by the operating company is not always reflected in its account. Some roads include the real cost of road and equipment of the leased line in the accounts of the operating line, but others do not. On the other hand, the account Investments in Affiliated Companies may represent large values of the affiliated companies not devoted to the service of transportation, as in the case of subsidiaries owning coal mines or other non-railway property. If in such cases the total of the account, Investments in Affiliated Companies, is used to measure against the requirements of section 15a, or of section 20a, the result would be an overstatement of the capital account upon which earnings may be demanded or against which securities may properly be issued. Consideration might well be given to the question as to whether or not there should be an account intermediate between account 701, Investment in Road and Equipment, and account 702, Improvements on Leased Railway Property; which would show the investment by the lessor company in road and equipment of leased railway property; and if with the leased railway property control of property similar to that embraced by account 705, Miscellaneous Physical Property, is obtained, a subdivision of account 705 might appropriately be provided for.

A Suggestion as to Rent for Leased Lines

2. In view of the preceding suggestion it may be well to invite consideration of the question as to whether or not the obligations of long term leases should be set up on the balance sheet just as the obligations of bonds and other securities are now represented. We have carried into our system of accounts the fallacy frequently held with respect to the obligation represented by a bond, to the effect that the face value of the instrument only need be considered. The obligation to pay the annuity is in the case of a long term bond of very much greater importance than the obligation to pay the principal amount at maturity. In this connection it may be asked if it would not be well to divide or subdivide account 755, Funded Debt Unmatured, according to the rate of interest borne by the obligations, and to provide a further account wherein the obligation to pay rents on long term leases would be represented on the liability side of the balance sheet

either by capitalizing the amount of rent at the rate indicated in the lease or otherwise at the rate fixed as a reasonable rate under the provisions of section 15a, with appropriate adjustments on the asset side of the balance sheet for amounts of capitalized values, if any, in excess of the real values of the properties leased. If it be thought unwise to carry any such amounts in the outside columns of the balance sheet it might be well, nevertheless, to show them in the inside or short columns. A direct application of the principle involved may be noted in a recent case in which the applicant stressed the fact that it had practically no bonded debt and consequently no fixed charge bearing debt, but admitted that rents due upon its leased roads were practically the same as interest payments on funded debt. If one company buys a property and issues against that property 100-year, 6 per cent bonds for the full purchase price, the result is substantially the same as that affecting the transactions of another company which should lease the same property or similar property for 100 years at 6 per cent on the estimated value or purchase price.

Depreciation

3. Consideration might be given to a change in the practice of showing accrued depreciation on the liability side of the balance sheet. It might be better to show it, as I understand is a practice with telephone companies, as deductions from the investment accounts in respect of which the depreciation accrued.

4. As a matter of temporary but considerable interest your attention may be invited to the fact that in respect of the adjustments of railway operating income in the administration of sections 204 and 209 of the transportation act we are required to eliminate improper charges to income, but we are not authorized to supply or increase charges not properly reflected on the carrier's books, and therefore carriers should understand that in making claims under sections 204 and 209 no charges for deferred maintenance or other operating expenses or for any other account against income can be allowed unless they actually appear on the carrier's books of account in accordance with our accounting regulations.

5. Your hearty co-operation is requested to secure a proper classification of items of ways and structures subject to depreciation in order that scientific bases of rates may be promulgated for application thereto in view of the provisions of section 15a of the Interstate Commerce Act.

Job Costs for Repairs

6. Serious consideration of the matter of maintenance accounts is requested with the view not only of classifying the expenditures, but also of ascertaining job costs for various classes of repairs. Such classifications in the test, Federal control and guaranty periods would have resulted in great help in solving present problems under the transportation act.

7. The Bureau of Finance thinks some consideration should be given as to whether or not maintenance of way and structure account No. 272, "Removing snow, ice and sand," should be classified as a transportation account similar to account No. 415, "Clearing wrecks."

8. When an order is issued under paragraph (18) of section 1 of the Interstate Commerce Act, authorizing the construction of a new line or the extension of an old line, and under paragraph (18) of section 15a retention of earnings is authorized for a period of years, the operating accounts should be so kept that the separate results of the new line or extension can be shown for the purpose of returns under section 15a.

9. In giving effect to section 209 of the Transportation Act, when any primary accounts other than those for maintenance of way and structures and maintenance of equipment during the guaranty period appear to be disproportionate, carriers should prepare statistics to show that such accounts, under the circumstances, are not disproportionate or unreasonable.

In confining my remarks, as I have, to accounting matters with which you are constantly dealing, I have had in view mutual helpfulness between the offices you represent and the three bureaus through which our related activities are administered. I am persuaded that we can save one another much trouble and expense through a more complete understanding of our respective needs and requirements. What I have brought to your attention has been put forward solely from that standpoint and I know that you will receive and consider it from the same point of view.

The Ground Covered by the Meeting

The association conducted its meeting this year in a new way which proved very successful. The organization has a comparatively small number of standing committees, the more important of which are the Executive Committee and those dealing with general accounts, freight accounts, passenger accounts and disbursements. These committees each consider a large number of subjects, and considerable use is made of sub-committees. The committee reports are prepared in detail and are submitted to the association membership in an agenda, published about a month or six weeks prior to the annual meeting. The agenda this year contained 500 pages. The reports of the committees on freight accounts and on passenger accounts each covered over 120 pages and each over 70 subjects. The annual meeting's opening session was on the morning of June 8. The business of the meeting, however, was begun on June 7 in the form of

meetings of several committees to which all members of the association were invited that they might have opportunity to discuss with the committee any points that were not clear. In case, as a result of the committee meeting, the committee found it desirable to change or enlarge upon its recommendations, its findings were made known in supplements to the agenda made up in mimeograph form and presented to all members of the association present. On the floor of the convention, discussion of the committee's report was conducted with the committee chairman on the platform, committee members being called upon to explain points concerning which there might be question. The committee report was not read in the manner usual of the railroad conventions; only those sections of it were covered in detail concerning which there might be discussion. These details are given to explain how it is that reports covering so much ground could be treated in a manner permitting adequate and satisfactory discussion.

The report of the meeting which follows is of necessity brief.

Report of the Executive Committee

Making R. A. O. A. Interline Accounting Recommendations Mandatory. Under the conditions now and heretofore prevailing, the rules of the Railway Accounting Officers' Association relating to interline accounting—that is, accounting transactions affecting two or more carriers—are, in fact, only recommendatory and have no binding effect beyond the merits of the recommendations.

It is worthy of note that the association's interline accounting recommendations have been generally adopted, on their merits, and are generally in effect on all, or substantially all, carriers.

According to the results of a canvass made a few years ago, the deviations from the R. A. O. A. interline recommendations, by individual roads, were trivial in number and inconsequential in effect. Those deviations are usually attributed to individual opinion or some local condition.

The principle is well recognized that carriers should account, in a uniform manner, for their interline transactions. Uniformity in this respect promotes fairness, fosters impartiality, and is necessary in the interest of the efficient and economical conduct of accounting among carriers. Uniform, standard rules—impartially applied—constitute an integral part of inter-road accounting.

Certainly, those conditions cannot be perpetuated which make it possible for a carrier to deviate from an interline rule according to the whim of the moment or according to its interest in the individual case, while under other circumstances the same carrier may insist on making a literal application of the same rule, when its interests lie in that direction.

If "the greatest good for the greatest number" is to be effective, it is hardly to be conceived that conditions can prevail which warrant a carrier sending to other carriers statements or reports of a size and arrangement that do not conform to a generally accepted standard. Reports, statements, or other interline forms—if lacking uniformity of size and standardization of arrangement—are the source of additional labor and inconvenience in filing and using such reports, statements, or other interline forms, by carriers receiving them.

So far as the executive committee has been able to ascertain, representative members of the Association believe that some of the interline R. A. O. A. recommendations and some of the standard forms devised by this association can and should be made mandatory and binding upon carriers. Other rules and standard forms probably should not be made mandatory and binding at this time, although the future may indicate that more progress can be made. The initial steps

in this direction will not attain perfection and will not represent any fixed or unalterable procedure for the future. The endeavor now is to make a start, and future efforts can be devoted to alteration, expansion, or intensive development, as experience may show to be wise and necessary.

The enforcement of mandatory rules in this connection need not cause us to pause very long. The professional pride of railway accounting officers will undoubtedly be sufficient incentive for them, individually, to enforce such rules. A penalty is not regarded as necessary, beyond bringing the failure to observe any particular rule to the attention of the chief accounting officer of the road at fault.

Any reasonable plans for mandatory rules would take cognizance of the latitude essential for progress and the incentive necessary for development of interline accounting. In other words, mandatory rules must not be so rigid and must not be so absolutely comprehensive as to exclude further progress and development.

This whole subject of mandatory rules for interline accounting, by direction of the executive committee, has been placed before the Committees on Freight, Passenger and Disbursement Accounts, and those committees will submit to the association, in their reports, appropriate detailed recommendations.

This subject refers only to interline freight, passenger and disbursement accounting. The subject has no connection whatever, with local accounting matters. In other words, it does not, in any way, relate to recommendations of the association regarding accounting local to one road or recommendations that partake purely of either an informative or co-operative nature. This subject does not refer, in any way, to freight overcharge claims, as the R. A. O. A. already has in effect mandatory rules for overcharge claims.

Your executive committee recommends to the association that it adopt and prescribe, as far as practicable, mandatory rules with respect to interline accounting for freight, passenger and disbursement transactions.

Committee on Valuation Accounting. Your executive committee recommends that the association create, for the ensuing year, a special committee on valuation accounting, consisting of nine members.

Honorary Membership for Frank Nay. Your executive committee unanimously recommends that honorary membership be extended to Frank Nay, who resigned as vice-president and comptroller of the Chicago, Rock Island & Pacific, effective February 1, 1921, to become comptroller of the Allied Chemical & Dye Corporation of New York.

To the Railway Accounting Officers' Association, Mr. Nay is, and has been, the source of inspiring and encouraging the loftiest ideals for the science and profession of railway accounting and for the association.

He has served this association as president, and has a long and honorable record of service on various committees of the association.

Membership Changes. During the current year your committee has admitted into the association 115 new members.

As of April 23, 1921, the Railway Accounting Officers' Association has 968 active members, representing 329,144 miles of railroad, also certain express companies and water carriers—an increase (as compared with April 21, 1920,) of 85 active members.

The association is now carrying the names of 25 persons on its honorary rolls.

Creation of Committee on Statistics. This recommendation was one of those submitted in a supplement to the agenda.

Heretofore the work of the association has been confined largely in the direction of uniform accounting, particularly with the settlement of accounts between carriers. During the year progress has been made in the matter of uniform

methods. All this, however, is within the well defined jurisdiction of the accounting department, whereas recent events have clearly demonstrated that if we are to maintain our present favorable position in the railroad organization we cannot work and live entirely within ourselves. During the past year, the president of the Railway Accounting Officers' Association has, on several occasions, been called upon to nominate members of the association to serve on committees to consider various matters in which the accounting department was largely interested but for which it could not be expected to assume full responsibility of final determination.

To accomplish the most satisfactory results, the association should be so organized that any subject in which the accounting department may be interested can be referred to a standing committee, which, acting as a whole or through a subcommittee, could consider such subjects with members of committees representing other departments, and thus secure reports on the results of such joint findings.

Your committee recommends that there be created for the ensuing year, a special committee on statistics, consisting of nine members, which would study and report on statistics of the nature necessary and useful to the carriers, but not involving returns required by governmental authorities. It is considered that subjects incident to the reports to be made to the Interstate Commerce Commission, etc., should continue to be handled through the Committee on General Accounts.

The secretary has been directed by your committee to submit an appropriate amendment to the constitution, for action at the 1922 convention, providing for the Committee on Statistics as a standing committee of the association.

Such a Committee on Statistics would undoubtedly be very helpful in forming a point of contact for the accounting officers with the other departments or organizations in railway service, that are intimately concerned with statistics.

Creation of Committee for Conference with Railway Treasurers' Association. The Association of Railway Executives has rescinded its previous action and has continued the Society of Railway Financial Officers, whose name will probably be changed to Railway Treasurers' Association.

Your Executive Committee recommends the creation of a committee for conference with the Railway Treasurers' Association, consisting of five members. Such a committee should be a special committee for the ensuing year, and the Secretary will submit an appropriate amendment to the Constitution, for action at the 1922 convention, making the conference committee a standing committee of our association.

The report is signed by J. G. Drew, president of the association.

Report of Committee on General Accounts

Material Accounting. There was placed before your committee a report prepared by the Committee on Disbursement Accounts of the Railway Accounting Officers' Association on this subject. Your Committee on General Accounts approves the principle that accounting for material should be under the supervision of the accounting department.

Depreciation Charges. The committee submits as information a report of the Depreciation Committee of the Presidents' Conference Committee on Valuation, giving suggestions as to depreciation accounts and the rates of depreciation on various classes of railroad property. The committee was formed to co-operate with the Interstate Commerce Commission with reference to the provision of the transportation act requiring the commission to prescribe rates of depreciation, etc.

Definition of Short Term Notes. The committee has approved a proposed order of the Interstate Commerce Commission as to modifications in the classifications of income, profit and loss and several balance sheet accounts for steam roads, covering the treatment of short term notes, defined in the

transportation act as notes having a maturity date in two years or less from date of issue. Short term notes were previously defined in the classifications as notes having a maturity of one year or less.

Accounting Procedure for Surcharge on Pullman Fares. Announcement was made that the work of checking Pullman surcharge accounting had been put by the Association of Railway Executives in the hands of the Express Central Accounting Committee, a body created by the Executives' Association, and of which A. D. McDonald, vice-president and comptroller, So. Pac., is chairman. The Committee is now organizing a bureau in charge of George W. Lamb, general auditor of the Auditing Bureau, New York.

Settlement of Balances Due by Canadian Roads. The Canadian authorities have instituted a plan of surcharge on current freight and passenger business, which will make it possible for the Canadian carriers to settle balances on current interline freight and passenger business in United States funds, without the necessity of any specific arrangement therefor.

All other balances, accounts, bills, etc., for services rendered or applying on business accruing on and after April 1, 1921, between Canadian and United States carriers shall be settled in United States funds. This arrangement shall be continued for at least ninety days.

The Interstate Commerce Commission has been asked for a ruling as to the so-called "back business" which would permit the carriers to effect the best possible settlement for accounts, bills, etc., accruing in connection with Canadian carriers prior to April 1, 1921. This was considered necessary in view of the commission's order making it illegal for carriers to accept settlements in depreciated currency, and the refusal of certain large Canadian carriers to settle in United States funds for this "Back Business."

The question also came up as to shipments from Canada for export through United States ports, it being explained that the railway traffic officers had made an arrangement which would permit such ports to compete with Montreal.

Suburban Passenger Miles and Passenger Revenue. Reference is made to the following communication from Dr. M. O. Lorenz, director of the Bureau of Statistics, I. C. C.:

At the present time the reports of passenger-miles and passenger revenue of steam roads cover all classes of passenger traffic. It has been suggested that the suburban business could be segregated without much additional labor. Such segregation seems to me desirable in view of the fact that the average revenue per passenger-mile from suburban travel is far below that of the regular passenger travel. I should be glad if you would refer this proposal to the proper committee for comment.

The committee understands that the commission will call for this information, confining it to "commutation" business as distinguished from "suburban."

Equalization Accounts. The committee included in its report, as given in the agenda, proposed text of accounts as suggested by the Interstate Commerce Commission, but discussion of the subject was omitted, as it is understood that the commission's suggested text has since been changed.

Subject: Compilation of Ton-Mile Figures.

This subject was covered in the agenda. The following was given in a supplement thereto:

The sub-committee handling this subject submitted the following report, which was accepted by the committee on general accounts:

The subcommittee, appointed to consider and report back to the members of the committee at its next meeting on the subject of the desirability of a uniform method of compilation of ton mile figures on Forms OS-A, OS-D and other reports of the Interstate Commerce Commission, is of the opinion that in order to bring about uniformity in reporting net ton miles (Item 10 on Form OS-A), the data should be computed from conductors' wheel reports for the following reasons:

(a) The data shown on Form OS-A relates to the actual movement of traffic during the month for which report is rendered and is related to the effort expended in transportation without reference to the revenues received, in that sense being solely an operating statement of traffic moved during the month.

(b) Neither the net ton miles nor gross ton miles actually moved during

the month can be correctly compiled from any reports usually made by Class I carriers other than wheel reports.

(c) It is assumed by your subcommittee that when reference is made to net ton mile statistics being computed from waybills the computation is made from either the monthly freight forwarded reports or received reports, according to the carrier's method of auditing its accounts; and not actually from individual waybills on which the date of movement of the traffic over various sections of the carrier's line would be stamped. On this assumption it is evident that the ton mile statistics of a large majority of Class I railroads would not represent the actual movement of traffic during the month as the calculation would be on the theory that tonnage reported either as received or forwarded from the first to the last day of the month would have either been forwarded from or delivered to stations during the same period. To illustrate—if a railroad audited its accounts on a received basis the calculation would be based on the theory that a shipment received at destination on the first day of the month was forwarded from the originating station on the same day; and so far as its interline accounts are concerned, it would be the assumption that it was forwarded by the connecting carrier on the same day. For this reason your subcommittee feels it is important that all carriers compile and report to the Interstate Commerce Commission the net ton mile figures on a uniform basis, because it is clear that compilation from waybills overlaps that from wheel reports.

It is the recommendation of this subcommittee that in order to obtain uniformity in calculating the ton mile figures required by Form OS-A, the following methods be used:

A. For carload freight the actual weight of lading be used in compiling net ton miles. Where impracticable to obtain the total actual weight of L. C. L. merchandise, estimated weights may be used as follows: (a) On through cars, 7 net tons per car or such other net tons as tests and experience of different carriers indicate is a correct average tonnage to use; (b) on peddler cars unloaded by trainmen, 6 net tons per car of such other net tons as tests and experience of different carriers indicate is a correct average tonnage to use.

B. In determining gross tons there should be added to the net tons as determined above, the stenciled weight of cars.

Your subcommittee recommends, if the compilations as outlined above are made at Division or outside offices, that for the sake of insuring approximate correctness, periodical checks be made to avoid errors of consequence.

The data required by Form OS-D, Item 4, has no reference to that required by Form OS-A, Item 10, and in order that it may be correctly compiled it must of necessity be calculated from waybills for the reasons outlined in paragraph (c) above. Your subcommittee is, however, of the opinion that on account of the substantial additional work required in order that absolute correctness may be obtained in determining the net revenue ton miles corresponding with the freight revenue each month, that approximate correctness can be obtained in calculating Item 4 on Form OS-D by using the ton miles ascertained as outlined above for Item 10 on Form OS-A, deducting therefrom the number of tons of company freight carried one mile, the calculation being made either direct from notations on wheel reports or from waybills or other records of actual movements in trains.

It is the opinion of the subcommittee that, covering a period, the method recommended herein will result in approximately as correct statistics of the movement of revenue freight and revenue per ton mile as though the compilation had been made from waybills and as in practically every case where a particular rate is under consideration special statistics are necessary, the method recommended herein would result in uniformly correct statistical matter at a minimum cost and is preferable to different methods of compiling the ton-one-mile statistics.

It should be understood that the recommendation made by this subcommittee refers entirely to the method of compiling statistics required by the Interstate Commerce Commission.

Settlement by Terminal Carriers with Intermediate Carrier. This subject was discussed in supplements to the agenda.

Whereas, during the past several months agreed balances, particularly freight traffic balances, have not been paid promptly, resulting in much embarrassment on the part of creditor roads, which were unable to meet their obligations due to the failure of debtor roads to pay on the dates specified. It is, therefore,

Resolved, That it is the sense of this Association that the attention of the Railway Executives' Association be called to the necessity of providing such measures as will be appropriate to end such practice.

The committee recommends that the following suggestions be embodied in letter transmitting the resolution, if adopted:

It has been suggested that unpaid traffic and other balances should bear interest from the first of the month following the date when such balances are declared to be due by the rules of this Association, or that perhaps a high rate in the nature of a penalty should be applied. The objections to the adoption of such method are that debtor roads would construe such a rule as sanctioning the withholding of payments provided that they pay interest, and that further it would offer a temptation to debtor roads to delay rendering reports, or even to withhold the inclusion of waybills, so as to minimize the amounts on which they would be withholding payment and paying interest (or penalty). For these reasons the adoption of a penalty was thought, perhaps, not to be the means of accomplishing the desired purpose.

The Railway Executives may wish, however, to consider the expediency of the adoption of a plan involving the payment of interest or a penalty.

In any event, suitable action should be had as will impress upon debtor carriers that they hold the moneys representing traffic balances only as trustees, and that unless carriers are freely in position to pay such balances as and when payable

under the rules of this Association; that such carriers shall at once take steps to segregate in cash in their own treasuries as collected, or remitted by Agents, such sums as will enable them promptly to meet traffic balances when due.

Reports Furnished Commission. E. M. Thomas, comptroller, C. & O., has been made chairman of a sub-committee to investigate this subject and to compile data showing the numbered reports which carriers are required to furnish the various commissions.

The report is signed by A. D. McDonald, vice-president and comptroller, Southern Pacific.

Report of Committee on Freight Accounts

Revenue Accounting, Forwarding Basis vs. Receiving Basis.—The committee in its original report drew up some detailed recommendations on this subject, but finally decided to hold the matter over for another year.

Special Form of Waybill Covering Perishable Freight. Your Committee submits herewith a special form of waybill to be used in waybilling perishable freight.

Your Committee understands that the roads generally, use some special form, or attach to the regular waybill stickers to designate preference movement, and it is the sense of your Committee that the adoption of the standard form, by all carriers, would result in uniformity, and eventually all employees handling such waybills would become familiar with the fact that they cover perishable shipments and require preference movement.

Safeguarding the Revenue of Intermediate Carriers. Your Committee is of the opinion that in principle there is no difference between the safeguarding of the revenue of intermediate carriers and that of waybilling carriers.

Your Committee therefore recommends that a check be made by the intermediate carrier to insure the reporting of waybills in interline accounts and that the distribution of the revenue be verified with the same care that is accorded the verification of other revenues accruing from interline traffic.

The following plan is recommended:

A passing report, R. A. O. A. Standard Form No. 119, to be made at the passing off junction station, except that when it is not practicable to prepare this report at the passing off junction station on account of there being no stoppage in transit on the lines of intermediate carrier, the report should be made by special arrangement between carriers at transfer point, breakbulk station, or elsewhere.

However, the intermediate carrier may make a passing report at the coming on junction station if necessary to safeguard its revenue. Where individual carriers require a passing report at coming on junction stations such carriers may obtain a copy of the passing off report from connecting carriers or make necessary arrangement for its compilation.

The preparation of this report on the basis of the passing off junction will permit of the exchange of these passing reports and materially reduce the expense of both junction agents preparing passing reports on the same traffic.

Showing Code Numbers on Interline Forms. Your Committee recommends that all interline forms interchanged between carriers, hereafter printed, show thereon the code number assigned each road for that purpose in "Waybill Code" circular, issued by the Secretary, under date of November 24, 1920, and supplements thereto.

The code number should appear in the same size and style of type used for the name of the railroad. A small space to the left of the railroad name should be allowed so that the code number will show conspicuously; for example:

900. North & South Railway Co.

The purpose in assigning numbers to the carriers in this connection is to establish a uniform code and eliminate the labor of coding by those carriers that need this information

in using mechanical devices for auditing purposes. The code number of the carrier issuing the forms, when printed as indicated, will tend to eliminate errors that might otherwise be made by code clerks.

The code number is especially desirable to facilitate waybill sorting which can be done more economically by numbers than by road names.

Placing Stamps on Back of Waybills. Your Committee recommends that all yard stamps, and all junction stamps in excess of four, be placed on the back of waybills.

Revision of R. A. O. A. Standard Form No. 98, Freight Waybill. Your Committee recommends that R. A. O. A. Standard Form No. 98—Freight Waybill, as shown in the R. A. O. A. 1920 Synopsis be cancelled and the form, as per sample herewith, be adopted.

Two-Figure Per Cent Divisions, Interline Waybilling. This subject vied with that of making R. A. O. A. interline accounting recommendations mandatory as exciting the most discussion of any of the subjects discussed by the Committee on Freight Accounts. The advantages of using two-figure per cent divisions and of interline waybilling were emphasized and attention was drawn to the fact that although the matter of simplified divisions had been discussed by the association for many years, no general action had yet been received. The subject was covered in the original text of the committee's report in the agenda. It was remanded to the committee twice, the final result being the following resolution:

Whereas, Interline or through waybilling of freight from point of origin to destination is desirable as an aid in economical and efficient railway transportation; lessens the time required for transporting freight; is helpful in the operation of junction agencies; reduces the number of overcharge claims, and facilitates the investigation of loss and damage, as well as overcharge claims, and

Whereas, Experience has demonstrated that without joint through rates and preferably two-figure percentage divisions, the accounting cost incident to interline waybilling is disproportionate, and

Whereas, The accounting officers, individually and through the Railway Accounting Officers' Association, have endeavored for a period of more than 33 years, to inaugurate or extend joint through rates and percentage divisions, therefore be it

RESOLVED, That it is the sense of the Railway Accounting Officers' Association that it is necessary to enlist the aid and direction of the railway executives in this subject, particularly at this time when the substantial economy resulting from interline waybilling and percentage divisions would mean so much to the carriers. To that end it is recommended that the Secretary of the Railway Accounting Officers Association be directed to secure from each carrier an estimate of the annual savings to be accomplished by the adoption of through rates and simplified divisions (two figure per cents), and that the President of the Railway Accounting Officers Association communicate the result to the Association of Railway Executives together with a statement of arguments in favor of simplified divisions and suggesting a constructive program for bringing them about; and be it further

RESOLVED, That the President of the Railway Accounting Officers Association appoint special committees to deal directly with the freight traffic committees of the several regions in the practical working out of the problem, and that such committees be instructed to present a program to the traffic officers and to urge its adoption; and be it further

RESOLVED, That as a further means of securing prompt action it is recommended that each chief accounting officer arrange, without delay, for a conference with his chief traffic officer and endeavor to formulate a plan of co-operative effort between accounting and traffic officials for the purpose of arranging for two-figure percentage divisions to be furnished the accounting departments when tariffs are issued, and to reduce to two-figure percentage divisions all existing divisions now on a complicated basis.

Making R. A. O. A. Interline Accounting Recommendations Mandatory. In accordance with the policy adopted by the Executive Committee relating to this subject, the Committee on Freight Accounts prepared its recommendations touching certain freight accounting rules and practices. The recommendations as first made up numbered 72 rules, made up in the statement of the provisions which are made mandatory and in the elaborate regulations for arbitration between carriers.

This subject resulted in considerable discussion both in the committee meeting on Tuesday and on the floor of the convention itself. The discussion at the committee meeting centered around the fact that in a number of cases the recommendations of the Committee on Freight Accounts did not agree with those of the Committees on Passenger Accounts and on Disbursements. The Freight Accounts Committee

recommendations required that changes in the rules should require a two-thirds vote, whereas in the case of the recommendations of the other committees only a majority vote was required. Objection was also made to a fee of \$10 to be paid by the carrier drawing attention to an infraction, which provision was not given in the other committee recommendations and to detailed provisions for appeal to the Freight Committee over a decision of the Arbitration Committee. The final action was in favor of making the Freight Committee recommendations uniform with those of the other committees. The proposal to make the R. A. O. A. recommendations mandatory was the subject of heated discussion on the floor of the convention, votes against tabling the matter and against remanding it to the committee for another year being required before the recommendations were finally adopted.

The provision relating to charges in the rules was made to read as follows: "Consideration has been given to various methods of voting on the mandatory rules, and your committee recommends that the adoption of the mandatory rules and future action regarding changes in the rules or additions thereto be taken by the ordinary voting plan."

A brief selection of the rules as finally amended is abstracted as follows. The recommendations which are made mandatory are not new, but have been given in the synopsis for some years.

1. The following rules, relating to interline freight accounting shall be mandatory and binding upon carriers operating in North America that are members of the Railway Accounting Officers' Association, and shall become effective and operative as of January 1, 1922, and shall be applicable to waybills made on and after that date.

2. NAME OF PLAN. Mandatory Plan of Audit Office Interline Freight Settlements.

3. FORMS.

- 98 Freight Waybill
- 99 Less than Carload Freight Waybill
- 100 A stray Freight Waybill
- 101 Live Stock Waybill
- 134 Transit Waybill
- 104 Abstract of Interline Waybills Received (8½ by 11 in.).
- 109 Abstract of Interline Waybills Received (11 by 8½ in.).
- 170 Abstract of Interline Waybills Received (8½ by 11 in.).
- 105 Interline Freight Division Statement.
- 107 Interline Freight Correction Account.
- 108 Interline Freight Statement of Differences.
- 110 Interline Freight Summary.
- 144 Interline Waybill Tracer.
- 147 Agent's Waybill Correction.

4. PREPARATION OF WAYBILLS. Waybills shall be prepared by the use of a typewriter, pen and ink, or indelible pencil. If indelible pencil is used, the writing should be set by a press or damp cloth.

5. WAYBILLS TO BE SETTLED. Interline Waybills between such stations and over such lines as have been agreed upon by the carriers interested.

6. COPIES OF WAYBILLS. Copies of Waybills shall not be furnished to destination or intermediate carriers except, that for specific purposes, copies of each individual waybill requested shall be furnished.

7. THE WAYBILL DESTINATION CARRIER SHALL BE responsible for the collection of and accounting for the proper revenues regardless of the final destination of the shipment, and shall promptly issue a waybill correction for each item prepaid or advances corrected, embracing all changes made on the original waybill while enroute or at destination, except that by agreement between carriers, differences in advances and prepaid may be adjusted by "Prepaid Only" waybills.

8. CORRECTION OF WAYBILLS. When an original waybill is corrected by a billing or intermediate agent, the change must be made in ink, showing date, where and by whom made. In such cases, waybill correction should not be issued by billing or intermediate agent. (See Rule No. 7.)

19. ABSTRACTS AND DIVISION STATEMENTS. The waybill destination carrier shall prepare abstracts of all waybills received and reported by receiving agents in the month's account for which settlement is made, showing thereon in the place provided therefor, the per cents, or other bases if divisions, and the apportionment of revenue. Waybills from each station to each station via each junction must be shown separately, each sheet to contain waybills from one station to one station only. By agreement between carriers, the receiving carrier may group a number of receiving stations from one forwarding station. Division statements similarly arranged must also be prepared, showing each carrier's proportion of the joint revenue from each station to each station separately.

20. The settling carrier shall retain original abstracts and division statements, sending first carbon copy to waybilling carrier and legible copies to each intermediate carrier as early as possible but not later than the 18th of the succeeding month.

21. When the settling carrier is unable to forward the abstracts and division statements in time to reach destination on or before the 20th of the month, it shall, upon request, on or before that date, notify carriers interested by telegraph, of their respective proportions of the freight revenue and in addition thereto advise the forwarding carrier the amounts of advances and prepaid.

22. STATEMENT OF DIFFERENCES AND CORRECTION ACCOUNTS. Discrepancies discovered by forwarding or intermediate carriers in waybills, abstracts, division statements, or correction accounts shall be taken up for adjustment

with the settling carrier in a statement of differences and if approved shall be embodied in a correction account by the settling carrier, together with discrepancies found in waybills, abstracts, division statements, or correction accounts to which attention may not have been called by any other carrier; provided, however, that corrections in the freight, advances, prepaid or proportions, which collectively amount to a net sum of less than one dollar (\$1.00) shall not be included in statements of differences or correction accounts, except that, if such differences affect the settlement with at least one of the interested carriers, including the settling carrier, to the extent of one dollar (\$1.00) or more adjustment shall be made with all carriers interested. When a correction has been excluded by reason of the minimum rule, and a subsequent correction increases the difference to one dollar (\$1.00) or more, the total difference shall be included in the correction account. (See Rules 39 and 40.) The minimum for correction does not relate to settlements with shippers and consignees, or in any way affect the integrity of the rate.

32. **SUMMARY.** The abstracts, division statements and correction accounts, with the summary as rendered, except as provided in Rule 33, shall constitute the basis of settlement. The summary shall be forwarded by United States or Canadian mail, if it will reach destination before the remainder of the papers.

33. Clerical errors in the summary shall be subject to correction before settlement is made, immediate notice to be given by telegraph.

34. **MANNER OF SETTLEMENT.** The settling carrier shall pay to each intermediate carrier, its proportion of the interline freight revenue, whether the freight charges are prepaid or collect, advances and prepaid to be included in the settlement with the waybilling carrier. Settlements shall be made upon balances, which shall be subject to sight draft, on or before the 25th of the succeeding month, except where special arrangements are made between interested carriers.

35. **JUNCTION AGENTS TO ACCEPT AND FORWARD WITHOUT DELAY INTERLINE WAYBILLS FOR SHORT FREIGHT.** Receiving and intermediate carriers shall accept and forward without delay through junctions to destinations, interline waybills for less than carload shipments routed via their lines, when all or a part of the freight checks short, the usual record of shortage at each junction to be noted upon the waybills.

36. **REPORTING WAYBILLS FOR SHORT FREIGHT.** When freight is short at destination, the waybills shall be reported, but on request of the destination carrier, the waybilling carrier shall immediately proceed to establish delivery of the freight and failing to do so within sixty (60) days from date of request, adjustment shall be made by claim in accordance with R. A. O. A. Overcharge Claim Rules.

37. **MATCHING WAYBILLS AND FREIGHT AT DESTINATION.** When the destination of short freight is a station on the line of two or more carriers, the agent of the carrier via which the shipment is routed who holds the waybill, shall advise the agents of the other carriers, of the shortage, giving a description of the freight. The other agents should carefully examine their records and warehouses. If the freight is found to be on hand, it shall be turned over to the carrier holding the waybill. If it has been received and delivered, the charges shall be turned over to said carrier. Provided, however, that when a carrier transports an entire shipment which is astray, and that weighs 5,000 pounds or more, the carrier holding the revenue waybill, shall surrender it to the carrier performing the transportation service. In the event the shipment (5,000 pounds or more) is only a part of a consignment, the remainder thereof having been handled by the carrier holding the revenue waybill, the carrier transporting the astray portion of the shipment shall, on an order from the carrier holding the revenue waybill, effect delivery to the consignee without charges. The revenue on the entire shipment shall be apportioned between the interested carriers on the basis of the weight handled by each. Provided further that when a carrier transports a car containing 1 c. l. astray freight weighing 5,000 pounds or more, the carrier holding the revenue waybills shall surrender them to the carrier performing the transportation service subject to the foregoing provisions of this Rule.

After the collection of charges from consignee by the carrier making delivery of freight received on astray freight waybill, any subsequent adjustment of charges with consignee shall be accomplished by such carrier.

39. **TRACING WAYBILLS IMPROPERLY REPORTED.** The waybilling or intermediate carrier shall send to the settling carrier a statement of differences, R. A. O. A. Standard Form No. 108, for each waybill reported, which cannot be located in the records of the carrier to which reported.

40. When the settling carrier finds a waybill has been improperly reported, it shall return the statement of differences showing the correct waybill reference or the month's correction account in which adjustment has been or will be made.

41. **TRACING UNREPORTED WAYBILLS.** After the accounts for the current and two succeeding months have been checked, waybills not reported by destination carriers must be immediately traced for by waybilling and intermediate carriers, a separate tracer, R. A. O. A. Standard Form No. 144, to be used for each waybill. Two copies of the waybill shall accompany the first tracer of waybilling carriers. No copies of waybill shall be required with first tracer of intermediate carriers.

45. **RESPONSIBILITY FOR PROPERLY TRACING FOR UNREPORTED WAYBILLS.** The responsibility for properly accounting for interline waybills rest primarily upon the settling carrier, but the waybilling and intermediate carriers shall share the responsibility to the extent of their revenues, if they do not promptly trace for unreported waybills as provided in Rules 41 to 44 inclusive, and Rules 46 and 47.

49. **PROCEDURE FOR CHANGING THE RULES.** Any member of the Association may take up with the Secretary any specific suggestions for adding to or amending these rules. Such communication shall be referred to the Committee on Freight Accounts for consideration and report to the Association. By a majority vote of the members present and voting, these rules may be amended or altered at any annual meeting of the Association, provided, however, that notice of such proposed amendment or alteration is given in the Agenda.

50. **PROCEDURE IN DISAGREEMENTS.** When any member of this Association disagrees with another member as to the interpretation or application of a mandatory rule, and cannot settle his dispute by ordinary methods, he may submit his case to the Interline Freight Accounting Arbitration Committee for a ruling, and the decision of the majority of the Arbitration Committee shall be binding on the parties involved.

When the decision of the Arbitration Committee has been reached, the

Chairman of the Arbitration Committee shall forward same to the Secretary of the Association, who shall notify all parties interested in the arbitration of the Committee's decision.

The carrier decided against shall within thirty days after receipt of the Arbitration Committee's decision, notify the Secretary of the Association that it has accepted and will abide by the decision, or within the same period, submit the case for consideration of the Committee on Freight Accounts as provided in these rules. Failure to so notify the Secretary or submit the case for appeal, shall be considered as refusal to comply with the decision, and the case shall then be handled in the manner provided in Rule 68.

51. **INTERLINE FREIGHT ACCOUNTING ARBITRATION COMMITTEE.** This Committee shall consist of three members directly in charge of freight accounting, one member from the eastern territory, one member from the western territory, and one member from the southern territory. Such Committee shall be appointed by the President after each annual meeting and shall serve until the next annual meeting.

52. **SUBSTITUTE IN CASE OF INTEREST.** If any member of the Interline Freight Accounting Arbitration Committee shall be interested in any question referred to such Committee, or shall for any other reason be unable to serve, the President shall appoint disinterested members of the Association eligible as substitutes for those interested or unable to serve. If the interest of the President in the specific case is such as to disqualify him for making the appointment, then the appointment of a disinterested member shall be made by the First Vice President, or if the First Vice President be unable to serve for the same or any other reason, then the appointment shall be made by the Second Vice President.

53. **COMPLETING ARBITRATION WORK.** The Interline Freight Accounting Arbitration Committee shall have thirty days, in addition to its regular term of service, in which to complete the arbitration of such matters as have been submitted to it by the Secretary prior to the annual meeting.

54. **DUTIES OF INTERLINE FREIGHT ACCOUNTING ARBITRATION COMMITTEE.** This Committee shall consider and act upon all matters involving interpretation of the R. A. O. A. mandatory Interline Freight Accounting Rules (except rules governing overcharge and agency relief claims) and involving disputes arising out of the application of such rules.

55. **NO EQUITY POWERS.** The Interline Freight Accounting Arbitration Committee shall have no equity powers, but shall decide upon the evidence contained in the papers. In giving decisions or awards the Arbitrators shall give decision on each and every question submitted and such decision shall be explicit and consistent so that it may be carried out.

56. **NO CAUSE OF ACTION.** When no cause of action lies under the rules, the Interline Freight Accounting Arbitration Committee shall so decide. In such cases, the \$10.00 Arbitration Fee shall be charged to the carrier or carriers arbitrating without cause.

57. **STATEMENTS TO BE SUBMITTED.** A comprehensive statement based upon the evidence in the papers shall be made and the points upon which a decision is desired shall be definitely stated. This shall be done over the personal signature of the officer directly in charge of interline freight accounts of the carrier desiring arbitration. All papers shall then be forwarded to other interested carriers for them to attach similar statements. A copy of the letter of transmittal shall be sent to each carrier which handled the file.

66. **PROCEDURE OF COMMITTEE, ETC.** When the foregoing requirements have been complied with (as to which the Secretary of the Association shall be the judge) the Secretary shall attach his acknowledgment of the arbitration fee and forward the papers to a member of the Interline Freight Accounting Arbitration Committee, not the Chairman, who shall render his decision in the case, and forward the papers with his decision to the other member of the Arbitration Committee, not the Chairman, who shall render his decision and forward his decision and all papers to the Chairman. The Chairman shall render his decision and forward the decision of the Arbitration Committee, together with all papers, to the Secretary, who shall return all the papers together with the decision rendered by the Arbitration Committee to the carrier from whom he received them originally. Each member of the Arbitration Committee shall send to the Secretary, a carbon of his letter of transmittal to the next member of the Committee. The Secretary shall notify each carrier interested the result of the decision of the Interline Freight Accounting Arbitration Committee.

67. **ARBITRATION FEE; HOW APPORTIONED.** The charge for arbitration shall be borne by the carrier or carriers against which the decision is given, and shall be apportioned by the Interline Freight Accounting Arbitration Committee at the time decision is rendered. The adjustment to be made by the rendition of bill against the carrier from whom due.

68. **DECLINING TO COMPLY WITH RULES.** When a member of this Association declines to comply with the decision of the Arbitration Committee, or states in writing that a mandatory rule, not involving a question of interpretation, will not be complied with, the case may be reported to the secretary, who shall notify the chief accounting officers of roads interested of his intention to place the facts before the members of the Association, and failing to receive, within thirty days, advice that this rule will be complied with, shall so arrange.

STANDARDIZATION OF STATION ACCOUNTING FORMS AND PRACTICES. Under date of October 6, 1920, J. G. Drew, President, Railway Accounting Officers' Association, wrote Secretary Woodson as follows:

The subject of standardization of station accounting forms and methods offers many opportunities for constructive work that will be of value and assistance to various members of the Association. All railroads have station accounting, and the variations on different roads are largely variations in details. It would be absurd to say that each road's methods or conditions in this connection differed entirely from the methods used by, or the conditions prevailing on, all other railroads. There undoubtedly are and there must be some broad, general principles of station accounting (both as to

forms and methods) that are applicable to all conditions alike. Our problem is to catch those principles, elusive as they may be, and make them captives for all who are now or may hereafter be concerned with station accounting. Such an achievement would be a material contribution to the advancement of railway accounting as a science.

The committee presented to the association 25 suggested forms covering this important phase of accounting. In presenting these forms, it said:

Your Committee, recognizing the scope and importance of this subject as outlined in the foregoing letter, and owing to the amount of work necessary and time required to compile a complete list of station accounting forms and practices, has confined its activity in connection with this subject this year to a study of the principal forms used in station accounting.

The advantages of a daily system of accounting are recognized and have been recommended, and in appreciation of the trend to this system by all carriers, the forms herewith submitted have been primarily predicated on that system. Your Committee has, however, endeavored to allow sufficient elasticity in the forms to enable the advantageous use of them in connection with a monthly system of accounting.

As an aid in its study your Committee secured station accounting forms from various carriers from every section of the country, the best features of which have been embodied in the forms drafted by your Committee.

In devising these forms, due consideration has been given to the individual requirements of the different carriers as reflected in the forms used by those carriers, and it is the opinion of your Committee that the forms herewith submitted are suitable for use at all stations.

Your Committee, therefore, recommends that the Association adopt the forms as submitted, which will have the effect of canceling R. A. O. A. Standard Forms Nos. 112, 114, 123 and 133, as shown in the R. A. O. A. 1920 Synopsis.

Your Committee further recommends that this subject be left with it for further consideration and report.

Discontinuing the Use of Fractions in Establishing Rates. The suggestion is made that the traffic departments should be asked to eliminate, as far as reasonably possible, the use of fractions in establishing rates.

"Fractions in rates cause additional labor to the agency forces and in the accounting department; also, fractions increase the possibility of error, and to that extent are the causes of overcharges and undercharges."

Through Waybilling of Freight. In the through waybilling of freight from point of origin to final destination, two vital conditions are necessary in order to do so economically, expeditiously, and at the same time protect the revenue of all interested carriers, viz: 1. Through rates, 2. Percentage divisions.

However, to reduce the rebilling of freight en route to a minimum, thus eliminating the possibility of errors, and thereby saving transportation delays, annoyances to patrons from overcharges or undercharges and the adjustments thereof, it is recommended:

1. That freight on which through rates are in effect, but no divisions, be waybilled through instead of rebilled at the junction, to avoid overcharges, on the theory that the ultimate apportioning of revenue between carriers on such traffic can be done more satisfactorily and economically through Audit Offices.

2. That accounting officers continue their efforts to secure the publication of joint through rates and percentage divisions to cover all traffic movements.

3. That we urge the early adoption of a uniform classification, which will more readily permit the publishing of joint rates, especially on inter-territorial traffic. The necessity for

the re-waybilling of freight is primarily caused through failure to publish joint rates.

Quality of Paper Used for Waybills. Your committee recommends the use of good quality (not less than 40-pound, 22 in. by 34 in.), manila paper, in printing waybills.

The report is signed by G. E. Bramon, auditor freight accounts, C. B. & Q. chairman.

Report of Committee on Passenger Accounts

The committee's report covered 72 subjects, the large part of the material given being of a technical nature submitted as information.

Uniform and Simplified Basis for the Division of Interline Passenger Fares. The committee presented for discussion the report of a sub-committee suggesting a method of dividing interline passenger fares on a so-called zone rate pro-rate basis. The proposed method was outlined in great detail and the suggestion was made that it should receive careful consideration by the member roads and left with the committee for further consideration and report.

Card Plan for Recapitulation of Interline Ticket Apportionment. The committee submitted as information two plans which have been worked out, one by J. F. Mitchell, ticket auditor of the Atchison, Topeka & Santa Fe and the other by J. C. Briggs, auditor passenger accounts, St. Louis-San Francisco.

Uniform Method for Handling Milk Traffic. Included in the committee's report was a detailed analysis of the systems of handling milk traffic which are in general use among owners, there being

- (a) The way-bill system of prepaid and collect shipments.
- (b) Ticket system which is distinctly prepaid, and
- (c) Combination of tickets and way-bills.

Indexing Stations in Official Guide. Your committee recommends the following for adoption by the association:

WHEREAS, It is found that the "Index of Stations" in the back of the Official Guide does not afford sufficient convenience to interline division clerks and ticket agents in locating stations, be it

Resolved, that this Association recommends that all large carriers publish a station index in connection with their time tables in the Official Guide, and be it

Resolved, That the passenger accountants of such carriers make request on their passenger traffic officials that this be done, and be it further

Resolved, That a copy of this resolution be transmitted by the Secretary to the Association of Passenger Traffic Officers.

Making R. A. O. A. Interline Accounting Recommendations Mandatory. With respect to the policy adopted by the executive committee, relating to this subject, the committee on passenger accounts has prepared recommendations, which seem desirable from a passenger accounting standpoint, for action by the association, and which are stated below.

1. The following rules, relating to interline passenger accounting, shall be mandatory and binding upon carriers operating in North America that are members of the Railway Accounting Officers' Association; shall become effective and operative as of January 1, 1922, and shall be applicable only to business originating on and after that date.

2. CODE-CLASSIFICATION AND REMARKS DATA. The following code shall be used in compiling interline reports and correction statements:

DS	Discharged Soldier	WT	Winter Tourist
FS	Furlough	ST	Summer Tourist
Cy	Clergy	Spl	Special Excursion
Ch	Charity	Dvt	Diverted
Emp	Employee	ED	Error in Division
Col	Colonist	EA	Error in Apportionment
Gv	Government	Rd	Redeemed
LG	Land Grant	TT	Ticket Tracer
Exch	Exchange	CI	Claim for Increased Proportion
HS	Home Seekers	CnE	Coupon Enclosed
AYT	All Year Tourist	UR	Unreported

Settlements. Settlements shall be made upon monthly balances, which should be subject to sight draft.

The remaining rules related to dealings among the passenger accounting offices in connection with Labeling Envelopes Containing Reports of Interline Passenger Traffic; Pre-

paid Ticket Orders—Method of Reporting; Exchange Orders; Interchangeable Mileage and Scrip Coupons—Method of Reporting; Correction on Interchangeable Mileage Statements; Baggage Collections—Method of Reporting; Tracing for Unreported Tickets and Baggage Collections.

The rules for arbitration are similar to those recommended by the committee on freight accounts as amended and shown above.

The report is signed by J. C. Briggs, auditor of passenger accounts, St. Louis-San Francisco, chairman.

Report of Committee on Disbursement Accounts

The chairman, on introducing his report said in part: The work of the disbursement committee for many years was confined to interpreting the accounting classification. Only in recent years has the committee undertaken any work dealing with the standardization of forms and accounting practices. Your committee in its report this year submits some recommendations along these lines, which it believes will be helpful to the carriers. There are many opportunities for constructive efforts in this direction.

Standard Voucher Register and Voucher Index. The committee considered this subject, which was left with it at the last annual meeting of the association with the result that four forms are recommended for adoption by the association:

R. A. O. A. standard form No. 211, vouchers audited register.

R. A. O. A. standard form No. 212, vouchers audited condensing sheet.

R. A. O. A. standard form No. 213, vouchers audited register.

R. A. O. A. standard form No. 214, vouchers audited condensing sheet by operating divisions.

Material Accounting. There was placed before your committee copy of a committee report, adopted at the June, 1920, meeting of Section VI, Purchases and Stores, American Railroad Association, which report contained a provision that it be submitted to the Railway Accounting Officers' Association.

It is understood that your Committee on General Accounts has recommended that the Association approve the principle that accounting for material should be under the supervision of the accounting department.

Your committee offers the following rules for supervision and accounting for material stocks as recommended good practice, realizing that organization and conditions on different roads may necessarily cause a variation from the rules and practices herein described.

1. **SUPERVISION OF MATERIALS AND SUPPLIES:** All material stocks to be under the general supervision of the Chief of the Stores Department, who should give general supervision to the ordering, receipt, care of and issuance of all materials and supplies, except that such supervision may be exercised over special classes of materials such as fuel, stationery, commissary supplies, etc., by special departments organized for that purpose.

2. Direct supervision shall be exercised by the officer in whose accounts the value of the unapplied material is carried.

3. **ACCOUNTING FOR MATERIALS AND SUPPLIES:** The Chief Accounting Officer shall have general supervision and prescribe the accounting for all material.

4. The officer in whose account the value of the material is carried shall keep such accounts and records, and render such reports to the audit office as prescribed by the Accounting Department.

5. **CLASSIFYING AND PRICING:** A standard material classification should be adopted for use by all railroads and for that purpose the Railway Storekeepers' Association's classification is recommended.

6. A standard price book should be maintained and the material charged out at actual cost, or where not available, at the average or latest price obtainable.

7. **PURCHASE INVOICES:** Purchase invoices having been checked as to price and other contract features by the Purchasing Department will be forwarded to the officer receiving the material to be checked against the received record and verified as to quantity, quality and condition.

8. After verifying extensions, make the following deductions when proper:

Transportation charges in accordance with the terms of delivery.
Credit memorandum received from shipper for the return of empty containers, etc.

Shortages, erroneous shipments, loss and damage or other deductions chargeable to the shipper.

Cash discounts if they are to be deducted from the face of the invoice.

9. Make following addition when proper:

Over shipments.
Errors in weight.
Freight allowances, etc.

10. Show on face of the invoice, class number of material, name or number of material account and month taken into account, invoice then to be taken into account certified as correct and returned to the Purchasing Department or other designated officer for voucher.

11. **TRANSPORTATION CHARGES:** All freight, express and other transportation charges such as switching, drayage, etc., paid by the railroad should be taken into the material accounts under the proper material classification.

12. **MATERIAL TRANSFERS:** Transfer invoices or bills covering material transferred from one stock account to another shall be taken into the receiving account as classified and for the quantities and amount as rendered, after which, they shall be checked against the received record, certified and any differences of overages, shortages (except Loss and Damages in Transit—see Paragraph No. 19) or errors in computation shall be adjusted in the succeeding month by counter or additional transfer invoices or bills.

13. **MATERIAL MANUFACTURED IN COMPANY SHOPS:** Material issued from stock in connection with shop orders for the manufacture of other material or articles, should be transferred from the original classes to the class "Material in course of Manufacture."

14. **MATERIAL RETURNED TO STOCK:** All released second-hand and scrap material should be taken into the material accounts currently on basis of prescribed prices, crediting the appropriate operating expenses or other accounts.

15. **MATERIAL ISSUED:** Material and supplies should be charged out on monthly distributions to Operating Expenses and other accounts as used. Certain items of material, such as lubricants for locomotives, train and station supplies and material for minor equipment repairs, the application of which is practically concurrent with the issue, may be charged out at the time of issuance, in accordance with the prescribed rules of the Accounting Department. The report for such material will be made to the Accounting Department by the officers in whose material accounts the value of the material is carried.

16. **TRANSFERS:** Materials and supplies transferred from one stock account to another shall be made through the medium of transfer invoices or bills, values to be based on current stock prices, and such material will be classified on the face of the transfer invoice or bill and credited to the material account from which transferred.

17. **MATERIAL IN THE COURSE OF MANUFACTURE:** Charges from shops to the material accounts for labor expended on "Material in course of Manufacture" on shop orders, should be taken into store accounts under the class "Material in course of Manufacture" and accounted for the same as other debits to material accounts. Upon the completion of the order the total cost of the manufactured article should be transferred from class "Material in course of Manufacture" to the proper class of the finished product.

18. **OBSOLETE MATERIAL:** Obsolete material should be accounted for by charging the account or accounts to which such material should be charged with the difference between the stock values and the amounts received from its sale or at its revaluation as scrap.

19. **LOSS AND DAMAGE TO MATERIAL IN TRANSIT:** Loss and damage to material in transit between stock accounts should be accounted for by the consignee taking into account the transfer invoice or bill and obtaining relief in accordance with existing rules of Freight Claim and Accounting Departments.

20. **LOSS AND DAMAGE TO STOCK MATERIAL:** Disposition of the value of material in stock accounts damaged or destroyed by fire or other causes, should be taken up with the Accounting Department as individual cases, who will issue instructions for the relief of the accounts.

21. **SALES OF MATERIAL:** Sales of materials and supplies to Individual and Companies shall be on the basis of the sale orders from the Purchasing Department and shall be charged direct on the monthly distributions and bills prepared on the basis of the prices and terms of delivery quoted on sale orders.

22. **BALANCE SHEETS:** Balance sheets shall be rendered monthly to the Audit office by each officer having a stock account, which shall show the balance on hand at the first of the month, material received, material released and taken into stock account, freight charges, payroll costs, etc., Total debit, and on the Credit side should show the total issues, sales and transfers to other stock accounts, etc., total credits, and net balance on hand at the close of the month.

23. **CLASSIFIED STATEMENT OF MATERIAL, RECEIVED, ISSUED AND ON HAND:** Monthly classified statements or balance sheets in detail by classification in accordance with Railway Storekeeper's Classification of material shall be rendered showing the amounts on hand as of the first of the month, receipts, transfers, total debits—issues, sales and transfers to other stock accounts—total credits and balance on hand at close of month.

24. **INVENTORIES:** Inventory of material and supplies including scrap should be taken periodically, at such times and in such manner as designated by the Accounting Department.

25. The prices applied to inventories should be the cost price of the material.

Standard Form for Reporting Cost of Ice and Salt in Connection with Perishable Freight. The committee recommends the use of a proposed standard form and plan worked up by the National Freight Perishable Committee. The plan is intended to assist the carriers to arrive at a more accurate ascertainment of the costs of ice and other materials entering into the handling of perishable freight.

(The remainder of the report of the accounting officers' meeting will appear in next week's issue.)

Business Meeting of Purchases and Stores Division

Material Accounting and Distribution Subject of Several Reports; Moving Pictures of Reclamation

A REPRESENTATIVE gathering of over one hundred officers of the purchasing and stores departments assembled at the Blackstone Hotel, Chicago, June 9, for the opening of the business meeting of the Purchases and Stores Division of the American Railway Association. The meeting was called to order at 10 a. m. by H. C. Pearce, director of purchases and stores of the Chesapeake & Ohio and chairman of the Division.

Following a few brief remarks by Mr. Pearce, R. H. Aishton, president of the American Railway Association, addressed the meeting. Mr. Aishton said in part:

Address by R. H. Aishton

I think that the text for all meetings and conventions that are being held today, not only in the railroad business but in every other, is economy and conservation. What we are all trying to do in the various sections of the American Railway Association is to develop means of producing economy and conservation that will appeal to the railroads, be adopted by them and result in greater economies.

This matter of economies is very largely in the public eye today. There has been some criticism made of the various sections of the American Railway Association as to lack of effectiveness. In other words, a section or division meets and does most earnest work. The division passes a resolution and prints it in a book and then we wait until the next meeting. When a body like you determines that a thing would be of advantage to the railroad situation, agree also that you will undertake to sell that proposition to the railroads.

There are two matters I want to impress upon you: Clearness in your reports and an absolute declaratory statement. If you believe a thing is good, leave this room with a determination to sell that proposition to your own railroad. A third matter is to let the public know what you are doing, because they do not know today and a great many of our misapprehensions as to the railroad situation arise from a lack of knowledge of what you are doing.

Your chairman asked me before the meeting what I thought about the railroad situation. I am an optimist. It is going to work out. It must work out. There is no question about it. We have solved such problems before and this problem is going to be solved in the same way. The work that you are doing in this division is one of the important factors, in my opinion, that will finally help to solve the problem right.

Chairman Pearce's Address

It was decided not to hold our regular convention this year due to the financial conditions of the railways and for the further reason that it is the duty of every organization, as well as every individual, to apply himself wholeheartedly to the task of readjustment by applying the most rigid economy both publicly and privately. After weighing all conditions carefully it seemed desirable to eliminate every expenditure we possibly could and at the same time to review the work that has been done during the year and lay out the plans for the coming year. With this object in mind a business meeting was decided on to consist of all members of the General Committee, all chairmen of subcommittees and as many members of the Division as each individual railway considered desirable to have attend. All members of the association will have the full privilege of discussion and participation in our work and we will endeavor to develop plans and recommendations for the coming year so that we may start out with a plan of organization which will carry

on the work effectively and be in a position to hold the regular annual convention of all our members next year as usual.

There has been little real constructive work accomplished by this division during the past year due to many causes. Emerging from federal control March 1, 1920, with organizations more or less disarranged, with the greatest activities known in the industrial world, prices climbing, deliveries practically impossible, federal inventories of every description demanding our attention, there was no time to deliberate or carry on constructive organization. While it is true there was little money allocated to carrying on and developing the work we could not have spared the time to have done the work even if we had had the money available.

At the conclusion of the address of the chairman a communication from W. G. Besler was read expressing regret because of his inability to attend the meeting and offering some suggestions regarding the work of the Division.

The minutes of the last convention were approved as printed and the report of the General Committee was then read. The committee reviewed briefly the reports submitted to the last annual meeting of the American Railway Association and the activities of the committees since the last meeting. The report was approved without discussion.

J. Marshall, special representative of the Freight Claim Division of the American Railway Association, addressed the meeting on freight claim prevention with particular reference to the part which members of the Purchases and Stores Division could play in reducing loss and damage.

Stores Department Book of Rules

Consideration was given to the book of rules through a questionnaire sent to 41 railroads, as well as in the discussion at former meetings. Suggestions for changes, additions or revisions of any part of the book of rules which the committee believes are worthy of consideration were set forth in detail together with the recommendations of the committee. Several of the recommendations for changes in the rules are made with the purpose of accommodating the rules to some particular type of railway organization, and where such recommendations would affect the fundamental principles of storehouse organization, the committee has declined to recommend their consideration.

Sample forms have been submitted by several railways for requisition blanks, stock books and receiving records, which differ in varying degrees from the forms recommended in the book of rules. The forms recommended were prepared for general adoption and use, and can be modified to suit the special requirements of any particular railway organization.

SUGGESTED CHANGES

A substitute was proposed for Part 1, Section 1, Paragraph 4, in which the committee did not concur.

Part 1, Section 1, Paragraph 7. The general storekeeper shall be responsible for the proper inspection of all fuel, released rail, lumber, piling, ties (track and switch), and all inspectors employed for this purpose should be carried on his payroll and report direct to him.

Objection is made to this paragraph on the ground that the work of inspection of material should be done by an inspection department. The committee does not recommend any change in Paragraph 7. The items covered by Paragraph 7 and for which the general storekeeper is held respon-

sible for the proper inspection, are in nearly all cases inspected on the line of road and can be more economically inspected by the stores department than by the inspectors of an inspection department.

Paragraph 11. The addition of a sentence specifying that the stock book be kept was suggested, but the committee considered it unnecessary.

Paragraph 17. A rearrangement of this paragraph was suggested which the committee did not approve.

Paragraph 18. The storekeepers at the different division points will report to and receive their instructions from the general storekeeper. It is suggested that this paragraph be rewritten: "The storekeepers at the different division points will report to and receive their instructions from such officers as may be designated by the proper official."

The committee does not recommend any change in Paragraph 18 regardless of the type of organization on the particular railroad; no principle in stores department organization is more firmly established than that the division storekeepers should report direct to the general storekeeper.

Page 51—Section 14. Pricing and classifying usable, needing repairs and scrap materials. All usable material, whether new or second-hand, should be taken into stock at new value, except rail and ties, or at a fixed percentage of the new value to be set by the general storekeeper. Exceptions may be made to this rule and certain items taken into account at fixed prices established by the general storekeeper, if desired.

It is suggested that for the sake of uniformity some definite rule should be laid down for the guidance of all roads, instead of leaving to the general storekeeper the decision as to what price second-hand, and needing repairs, material should be taken into and carried in stock. It is suggested that a certain percentage of the value of the new material should be stated.

The committee does not recommend any change in section 14 as written, believing that a statement of the general principles under which second-hand and scrap material should be handled is sufficient, leaving to each railroad the matter of prices, which must be governed by conditions which prevail in connection with reclamation work and the use made of second-hand material.

It has been suggested that in connection with the delivery of material along the line of road by supply trains some additional recommendations in the matter of accounting for material on the line of road should be made. Special reference is made to material delivered by supply trains and not intended for immediate use.

The committee recommended that the material be carried in stock until used.

Considerable interest is manifested in the use of stock books in division storehouses and the master book in the general storekeeper's offices, the replies from the various railroads indicating a general use of the stock book as recommended by the Railway Storekeepers' Association and Section 6, with such modifications as seem necessary to meet the requirements of the individual lines.

The report was presented by J. W. Gerber, chairman.

DISCUSSION

W. F. Jones, New York Central, in discussing Section 14 stated that the practice of charging out second-hand material at various rates makes comparisons between roads difficult. He advocated the adoption of a definite percentage of the value new. On the Santa Fe and the Burlington second-hand material is taken in hand and charged out at the price of new material. The Southern Pacific uses one-half the price new to provide an incentive for using such material.

D. C. Curtis, Chicago, Milwaukee & St. Paul, described the system of stock books used on that road. The master stock book used at the general store is too cumbersome for

use at smaller points. For outside stores, loose-leaf forms are used, each having the line, page and class shown corresponding to the master stock books.

The rules as amended by the committee's report were adopted and the committee continued.

Classification of Material

The committee sent out a questionnaire to which replies were received from 78 roads. It would appear from the replies received that only about one-half of the member roads have adopted and are using this material classification. Of this number about one-half favor it with no changes to suggest, and claim that it is not costing any more to operate than the classification formerly used, and permits of a better analysis of material used.

The committee recommended several additional subclasses and the transfer of items to permit of closer analysis of values carried. These were as follows:

Class 1c—Take motor, hand, push, and velocipede cars and parts of same from this class, which includes track tools, track materials and wire fencing, and segregate them in a new group as Class 1d.

Class 4—Segregate bridge ties as Class 4a and include lumber, bridge and building, piling and posts as Class 4b.

Class 5b—Separate treated from untreated cross ties, designating the former as Class 5b and the latter as Class 5c.

Class 8—Segregate new rail from second-hand and scrap rail, designating the former as Class 8a and the latter as Class 8b.

Class 13b—This class is created for arch brick for locomotives, removing it from foundry supplies.

Classes 14 and 15—Soft metals in bars, pigs or sheets are taken from Class 15, which includes bar iron and steel, etc., and are placed in Class 14, which includes brass, copper and steel tubing, etc.

Classes 18 and 20—Car forgings are removed from Class 20, which covers car castings of all kinds, brake beams, couplers, metal bolsters, side frames and metal roofs, and are placed in Class 18.

Class 36b—This class is created to cover grain doors, grain and coal door lumber and coopering material for grain and flour cars which are now included in Class 36 with locomotive train and station supplies.

Class 37a—This class is proposed to cover locomotive and car lubricants, exclusive of wool waste, in order to segregate them from all oil house material now included in Class 37.

Class 37b—Includes all oil house material other than locomotive and car lubricants.

The committee further recommended that before the proposed material classification, if adopted, is issued the entire detail or index be gone over with all member roads interested; any stock items not shown being listed and furnished the committee handling this subject for the coming year; also calling attention to errors in units and descriptions.

The committee further recommended that this work of preparing the proposed classification complete with index be assigned to two or three men selected from various interested roads using same, and that ample time be given to complete the work. It is felt that the regular committee assigned this subject cannot devote the time necessary to revise all the details, in bringing this classification up-to-date. The report was presented by C. H. Rost, chairman.

DISCUSSION

With the exception of the changes in Class 37 all of the recommendations of the committee were adopted. During the discussion of the various items considerable difference of opinion was expressed as to the advisability of constantly enlarging the classification. Some of the members are opposed

to a large classification and it was suggested that what was needed was a revision of the classification rather than an enlargement.

The committee was continued and enlarged to enable the appointment of technical sub-committees for handling its future work.

Material Accounting

This committee had not new material to present, but urged the importance of carrying out the present rules. These were adopted by the former Railway Storekeepers' Association at the 1919 convention and were submitted as part of the committee report at the meeting of the Purchases and Stores Division at Atlantic City in June, 1920. The report was referred to the American Railway Accounting Officers' Association for the information and approval of that body, which has it under consideration.

The report was presented by W. E. Brady, chairman.

Uniform Accounting

By H. H. Laughton

Assistant to Vice President, Southern Railway

This subject, so frequently discussed but never concluded to the satisfaction of all carriers, during the past year has been actively before the appropriate committee of the Railway Accounting Officers' Association. The following suggestions are largely in line with the recommendations of its disbursing committee.

SUPERVISION

Unapplied material, irrespective of location, should be under the direct general supervision of the chief of the stores department, who should have general charge of the ordering, receipt, care and issuance of materials.

ACCOUNTING

The chief accounting officer should prescribe the accounting, and through his subordinates should periodically check records, reports, and all local department documents upon which materials and supplies transactions are recorded to see that they are properly kept and that proper distributions of issues are made in obedience to rules of the Interstate Commerce Commission. Accurate accounting can be best secured by having the detail work performed at the local, divisional, or district store, as the actual data can be more accurately obtained at such points than when the accounting is centralized in the general office.

CLASSIFICATION

The universal adoption by all carriers of the standard classification as made by the Railway Storekeepers' Association is advised, to the end that proper comparisons may be procured for the benefit of all railroads. There can be no objection to increasing the number of sub-accounts in any given class to meet local requirements of individual carriers.

PRICES

The charges for material issued should be made at actual cost, or where that is not available, at the average or latest price obtainable. A standard loose leaf price book should be maintained and kept up-to-date.

PURCHASE INVOICES

Accounts payable should be checked as to prices and other contractual features against the original purchase order by the purchasing department and forwarded direct to the officer to whom the material is consigned, who should check each invoice against the receiving record and certify as to quantity, condition, quality, etc. Extensions and calculations should be accurately verified. Deductions, when proper, should be made as follows: Cash discounts when to be taken from invoice; transportation charges according to terms of

delivery; credits from shippers for return of empty containers; erroneous shipments, shortages, loss and damage, or any other deductions which should be charged to shippers.

Additions should, when proper, be made for freight allowances, over shipments, errors in weight or rates, etc.

On the face of the original invoice should be designated the class number of material, name or number of material account, date received and month taken into account. It should be certified as correct and listed to the purchasing department where vouchers should be prepared for settlement.

All freight, express and other transportation charges paid by the carrier should be taken into the appropriate material accounts under the correct classification number.

MATERIAL MANUFACTURED IN COMPANY SHOPS

All material issued from stock on shop orders for manufacturing other articles should be transferred from the original classes to the class "material in course of manufacture."

All charges from shops to the material accounts for labor expended on material in course of manufacture are accounted for the same as any charges in the material account. The total cost of the article manufactured should then be transferred to the proper finished product class.

RECLAMATION

The operation of all reclaiming plants should be under the supervision of the stores department.

MATERIAL ISSUED

Materials and supplies issued for current use should be charged out on monthly distribution reports as designated by the I. C. C. classifications. Reports of issues should be sent direct to the designated representative of the accounting department and copies forwarded to the appropriate officer of the stores department.

TRANSFERS

Transfers made on proper authority from one stock account to another should be through the medium of transfer bills, invoices or requisitions, values of materials transferred to be based on current stock prices. Proper classification should be given on the face of the transfer bill. Quantities and values should be taken into the receiving account as classified on such bills. Overages, shortages, or errors in calculations should be adjusted in the succeeding month by contra-bills.

MATERIAL RETURNED TO STOCK

All released, new, reclaimed, second-hand and scrap material should be taken currently into the proper material accounts on the basis of prescribed prices, to the credit of the appropriate operating expenses or other accounts.

OBSOLETE MATERIAL

When material becomes obsolete it should be immediately considered as scrap and accounted for by charging the proper account to which it would have been charged with the difference between the stock value and the amount of its revaluation as scrap or the amount realized from its sale.

SALE OF MATERIAL

Material and supplies sold on authority of the stores department on sale orders from the purchasing department should be covered by collectible bills or sale invoices based on prices, loading, terms of delivery, etc., as specified on sale orders. These bills should be promptly forwarded to the proper officer for audit and collection. The materials and supplies should be charged out of monthly distribution report for the month for which the materials were shipped.

LOSS AND DAMAGE

Material lost or damaged in transit between stock accounts should first be taken into account by the consignee, and

relief should immediately be granted either by the freight claim or accounting department. Disposition of the status of material that is carried in stock accounts which is damaged or destroyed by fire, floods or other causes, should at once be reported by individual cases to the accounting or claim departments. Prompt relief to the stock account should be granted therefor.

BALANCE SHEETS

There should be rendered to the accounting department by each officer having a stock account a monthly balance sheet, which should show the balances on hand at the first of the month, materials received through purchase, transfers, release and taken into stock account, freight charges, payroll costs, corrections, etc., and the total debit on stock on the credit side. It should show the total issues, sales, transfers to other stock accounts, corrections, etc., total credits, and the net balance at the close of the month.

The accounts should be held open after the end of each month the agreed length of time for taking into that month's balance sheets all obtainable bills payable or transfer invoices received and procurement of requisitions for material issued during the same month. There should also be made each month classified balance sheets in detail in accordance with the Railway Storekeepers' Classification.

STOCK BOOKS

In each department there should be kept detailed stock records especially prepared to cover a period of two years' operations. A master stock record should be kept for all stores by the general storekeeper.

INVENTORIES

There should be taken periodically on the last day of a designated month, not less than twice a year, a full and complete inventory of all unapplied material, including scrap and obsolete material, wherever located. The prices applied to all inventories should be the cost price of the material as reflected by the records. It is frequently desired to take inventories of certain classes of materials monthly. Materials and supplies in transit between stores at the time inventories are taken should be listed on separate sheets as a special exhibit, to be added to the amount on hand.

Materials and supplies on hand when the inventory is taken and included therein, or which may have been issued prior to taking the inventory and charged out, but for which purchase invoices or bills payable have not been received and taken into account, should be listed on separate sheets as a special exhibit to be deducted from the gross amount of material on hand.

Transportation and other charges which may have been included in the cost of material and charged out prior to the completion of the inventory, or included in the cost prices but not taken into account prior to closing, should be listed on separate sheets as a special exhibit to be deducted from the gross amount of the inventory.

All materials reported on special exhibits should be properly classified on such exhibits and either added or deducted from the appropriate classes of the final summary. The net amount of the inventory should be the basis for starting the balance sheet of the stock account on the first of the month of taking inventory. Adjustment of the overs or shorts, as reflected by comparison of balance sheets and inventories should be made by the accounting department.

DISCUSSION

Exception was taken to the recommendation of the author that the inventory be taken twice a year by several members, who objected to the extra expense and considered one adjustment a year as all that is necessary. It was suggested that the use of a price book might be an obstacle in clearing accounts if it is not kept up-to-date, particularly under market conditions when prices are rapidly changing.

Purchasing Agents' Office Records

The committee (C. E. Walsh, Asst. Pur. Agt., Pennsylvania System, Central Region, chairman) unanimously recommended for use as standard in purchasing agents' offices, Form 12-4, an order form (original) and Form 12-4-a, an office copy of the order form.

The committee had also investigated the fan fold machine for writing orders and "is of the opinion that it should be considered where a large number of orders are issued."

The committee was of the opinion that it is not necessary to recommend any particular form for a requisition record in the purchasing agent's office. It recommended the use of the same order form for lumber and stationery as for other material.

During the year the committee prepared several standard forms for use in connection with the requirements of the Clayton anti-trust act.

The chairman of the committee and Assistant Secretary Farrell had several conferences with representatives of the National Association of Purchasing Agents in connection with its proposed invoice form; the committee recommended that next year special attention be given to this form by the new committee, as it is believed considerable money may be saved by the adoption of a standard form of invoice. It should, of course, be understood that the committee of Division VI should confer with the Railway Accounting Officers' Association and the National Association of Purchasing Agents before making any definite recommendations.

DISCUSSION

F. D. Reed, Chicago, Rock Island & Pacific, advocated the use of the uniform invoice. The Rock Island sends its own invoice blank with every order for material. The discussion showed that practically all roads favored the adoption of a standard form and some were already using the one recommended.

H. C. Pearce stated that roads that have not adopted the standard invoice have been deterred from doing so because of the expense involved. The plan proposed by the National Association of Purchasing Agents requires the sellers to provide the standard invoice and should insure its general adoption.

Mr. Pearce recommended that this division confer with the National Association of Purchasing Agents and the Accounting Officers' Association to prepare a standard form of invoice to be furnished by the sellers. The report was accepted and the committee instructed to carry out Mr. Pearce's suggestion.

Unit Piling for Counting

J. G. Stuart (Gen. Storekeeper, C. B. & Q.,) presented an individual paper on this subject. He said in part:

Proper methods of storing material on shelves and in bins and the proper piling in racks and in piles is a long step forward in making it possible for the stockman to get the correct information as to the amount of material on hand and to get it easier.

What is meant by "piling in units?" Simply this: that when material is being placed in stock a certain number of pieces are designated as a unit and as the material is stored it is separated so that each unit contains the designated number of pieces and each unit is in some way separated from the other units of the same material and stands out alone so that, in counting the stock, the stockman counts the units and not the items. For example: If machine bolts were piled in units of 100 each the stockman would count the units and would not attempt to count the bolts. If the pile contained eight units he would count the units and know he had 800 bolts. In case one of the units should be broken so that there were eight full units and part of the ninth, it would, of course, be necessary to count the number of bolts

in the broken unit to get an accurate count of the pile.

In the same way a great many other items, in fact, practically all items of storehouse material, may be piled in units. Bar iron may be piled in units 50 or 100 bars and separated by a wire or a stripe of paint or by recessing a few bars an inch or two back of the face of the pile. Galvanized, black sheet and light sheet steel when piled flat may have the first sheet in each unit extend an inch beyond the face of the pile, in this way making the separation very distinct. Heavier sheet steel may be piled in the same way or all sheets may be piled flush with the face of the pile and a stripe of paint be put along the edge of the first sheet in each unit to mark the separation between the units. Pipe fittings and other small articles may be separated by sheets of scrap steel or tin or cardboard and have a unit piled on each sheet, or trays may be made and a unit put in each tray and the trays put one above the other. Rope received in coils may have tags attached showing the number of feet originally in the coil and the number of feet still left in the coil. Coiled chain may be handled in the same way or if removed from containers and put in bins, tags or washers may be attached to every 50 or 100 feet so that the first tag out shows the total number of feet still left. Leather and rubber belting and hose, when received in large coils, may be handled the same as rope or chain. Gaskets and other items of which large numbers are carried in stock may be put on strings 50 or 100 if count is required, or in packages containing a certain number of pounds if weight is required.

Unit piling may be followed in any store as the improved appearance of stock will usually justify it, but the real benefit in stock taking is obtained where larger quantities of material are carried.

So far as it is possible, the units of each article should be of such number as is usually issued at one time so that the time ordinarily spent in counting or weighing when the material is issued may be saved. In many cases it will be found possible to change the amount to be issued, especially where material is being transferred between stores, so that complete units may be issued.

Some of the advantages obtained in unit piling are as follows: More accurate information as to quantity on hand: When material is piled in units it eliminates the errors which might naturally creep in when material is being counted and, if errors should be made in count when the units are being piled, the different size of the units will be apparent and make it easy to detect the mistakes. The stockman, in going through his stock, in most cases, will be able to get the amount on hand in from one-half to one-tenth of the time which would be necessary if he had to stop and actually count the items instead of counting the units. By giving a more accurate knowledge of material on hand it enables the stockman to more intelligently place his orders or refrain from placing orders and, in this way, enables the store to give better service. Material piled in units always presents an orderly appearance. While it is possible to pile material orderly without piling in units, it is impossible to pile in units and have it disorderly. It conserves material by making it necessary to take better care of material. It conserves space: Unit piling gets the maximum amount of material in a given space and by keeping the material in units it prevents scattered and small piles.

DISCUSSION

U. K. Hall, Union Pacific, spoke on the advantages of unit piling. He stated that where material is not properly piled the storekeepers lack the proper knowledge of the stock on hand and therefore proper piling is reflected in the amount of stock carried. The tray system is used extensively on the Union Pacific and has reduced the time required to take stock fully 50 per cent and has resulted in more accurate records.

Other speakers told of similar results from the introduction of this system.

Handling and Distribution of Material to the Users

The committee (W. D. Stokes, Asst. Gen. Storekeeper, Ill. Cen., chairman,) presented a report of which the following is an abstract:

The purchasing agent must purchase the material and deliver it to the railroad for which it was ordered. The general storekeeper must take the material from this point and follow it to the user, recovering, reclaiming and reporting the salvage.

In order satisfactorily to carry out such procedures as are necessary, the first consideration should be given to the location of stocks, it being an essential that they be placed to the best advantage for delivery when and where wanted without causing an excess investment or unnecessary movement. The ideal arrangement would admit of one general store, as this would provide adequate and thorough inspection, test, check and care of materials, which should be located with proper reference to geographical relationship of the territory to be served and also to the sources of supply. It may be necessary, when conditions warrant, to duplicate this idea by the establishment of district and division stores, but there should be no greater investment in the base supplies than is necessary properly to take care of the requirements.

By restricting the number of places where stock is carried, a larger and more general stock can be maintained for the investment, and the opportunity is enhanced for having on hand that which is wanted.

STORE DELIVERY OF MATERIAL

Delivery to Shops—The shops representing the largest users of classes, if not values of materials, must be first considered. A practical plan is for the stores department to deliver material to the users in the shops, for economic and other reasons; it prevents expenditures for wages to high-priced mechanics, who are frequently used for this purpose. It keeps them at their work, and their machines in operation during a period which otherwise would cause them to be absent securing needed materials. It enables the supervisory forces to keep in closer touch with the progress of the work and the actual needs of the mechanics.

This system ensures accuracy in accounting by reason of requiring that all material orders be revised and the proper description entered thereon by the store delivery supervisor, before they are delivered to the office. It provides the means for obtaining a material order for all material issued. It enables store employees to observe the use of material by coming in personal touch with the men who are actually using it and provides a method by which they can intelligently anticipate and provide for the needs and satisfy themselves that the men will utilize the material as intended. It results in delivering material to points required in less time than other systems now in effect and at a minimum expense. It ensures an opportunity for locating and returning to store stock, materials drawn for use and not applied. It ensures the proper supervision over the manufacture of materials on orders and the return of the finished or repaired products to the store, when completed. It encourages the use of serviceable second-hand and repaired material in lieu of new, and enables by co-operation, to dispose of shop worn material in proper sequence. It prevents inadvertent disarrangement of stock.

Recommended Methods of Delivery to Shops—Delivery of material to shops and repair yards should be made by stores department employees with their own forces and facilities, as well as the return to the store of all material manufactured in the shops, and all material not used for the specific purpose for which drawn.

The work must be under the direct charge of a supervising employee fully capable of co-operating with the user to the extent that only what is required will be delivered as actually needed and of a quality approved as suitable and economical for such use.

The patrol box system is recommended, which consists simply in arranging boxes at specified places in and around shops, where material orders shall be placed and gathered on schedule as provided, and checked by proper supervisory forces. It is less expensive to install and will provide more satisfactory and reliable results. The committee carefully considered the feasibility of the use of the telephone and annunciator systems, and also recommends them when feasible.

When installing shop delivery where it has not been previously effective, a careful check should be made prior to so doing, of the exact cost under the old plan for doing the work—in order that the saving effected may be clearly and decisively shown—and such records should be maintained as may be necessary for illustrating the cost from month to month.

DELIVERY TO LINE OF ROAD

Supply Train—The supply train serves the same purpose for the line that the store delivery does for the shops in precisely the same way. It places the representatives of the stores department in personal contact with the users on the line; it places the storehouse at the disposal of the men on the line that use the material; it establishes the closest and unified relation between the two, which, when coupled with a thorough inspection by the supervisory officers, as it should, furnishes the ideal method of distributing material on the line.

Rail—In the handling of rail the plan must be broad enough to take into consideration all conditions. Generally speaking, new rail should be delivered direct to where it is to be used. Second-hand and relaying rail, except assigned rail for other purposes, should be assembled at central points (as few as possible) where it can be reinspected, reclassified, reclaimed and reshipped. We heartily endorse the report of the Rail Committee, known as Subject 14, which was approved at the 1920 Annual Meeting of Division VI, Purchases and Stores.

Cross and Switch Ties—Generally speaking, cross ties should be shipped and unloaded direct where they are needed, either from the manufacturers' right-of-way or from the treating plants. In many cases the distribution of cross ties can be carried out advantageously with work trains, and in some cases the work can be done by the supply train. On other roads the supply of ties can be generally provided along the right-of-way. No plan for the distribution of cross ties can be adopted that would be satisfactory to all conditions.

Switch ties should be purchased to specified lengths and shipped to a central yard (where they should be assorted into lengths) from which point they should be distributed as ordered.

Bridge and Building Lumber—We are strongly in favor of bridge and building lumber and other materials connected therewith, such as mill-work, hardware, etc., being assembled at as few places as possible, one being preferable, and having all lumber, mill-work, hardware, and other materials assembled and shipped complete direct to the work. This plan does not prevent heavy material like steel girders, stringers, piling, brick, cement, etc., being shipped direct from the sellers, but the fundamental principle of having the material assembled so that all is available and can be forwarded to the work, and the users notified so that forces must not be sent out before material is available, is sound and should be adopted as standard practice.

EMERGENCY STOCK

We recognize the necessity of having an emergency stock of bridge and building and track material at certain locations in case of washouts, floods or other disasters. The amount and kind of such stocks must be determined by the local conditions. Such stocks shall be under the control of the division storekeeper and carried in his stock and he shall be responsible for maintaining them according to the authorized list.

Transfers Between General Store and Division Stores—The usual method would be in carloads in through freight trains, but recognizing the need of having fast service, it is recommended that a certain number of baggage cars be assigned, operating between the general stores and the various division stores. Where baggage cars for this service are not available, then baggage cars on the regular trains can be used, but special service is recommended.

Distribution to Roundhouses, Inspection Points and Large Terminals—The principal inspection points and terminals should be provided for through the division stores, although there are many railroads where this is not practicable and provision can be made from the general store. The reason why it is more desirable to protect these points through the division stores is that the division storekeeper is, and should be, in closer touch with the division officers, and in position to provide, police, control, and therefore be responsible for the requirements, better than any other officer. Generally speaking, this class of material should be delivered via local freights and via baggage cars from the division stores.

Minority Report

C. D. Young, general supervisor stores, Pennsylvania System, made a minority report as follows:

Stores Delivery of Material—It is my recommendation that a paragraph be inserted under the heading "Stores Delivery of Material" to provide for small articles of little value, but of frequent use, which are disposed of by a large number of charges; the thought being that Working Stock Sections should be provided for such material, these Working Stock Sections to contain only an authorized list of items which might be carried as such. By such an arrangement a reduction is made in the accounting; and the material is convenient to the workmen and does not require attendance of material distributors as provided for under heading "Delivery to Shops." Objection was raised by some of the members, who stated that this was not good stores practice, as it resulted in unauthorized use of material and improper charges. I disagreed with this view, and explained that by having a proper authorized list of those items which should be contained in the Working Stock Sections, the first object was met, and that by proper disposition, in a short period of time, of the items consumed, proper charges could be made from an accounting standpoint. I am still of the opinion that this is good stores practice and had in mind that it should be included in the report under "Recommended Method of Delivery to Shops," as supplemental to the patrol box system which was touched upon, with which system I am thoroughly in accord.

Delivery to Line of Road—Under this heading the supply train is recommended; but I feel that the supply train should be supplemented by the use of, and in some cases replaced by, supply cars traveling as a part of local freights or other convenient scheduled train service, and that the report should recognize the desirability, under certain conditions, of operating supply cars as outlined, as well as supply trains.

DISCUSSION

The principal discussion centered around the minority report. Some of the speakers did not consider the establishment of emergency stocks as desirable and advocated that material

should be in the hands of the stores department until actually applied. Others stated that emergency stocks were valuable especially in large shops and no disadvantages were noted in handling material in this manner. The majority report of the committee was accepted.

Moving Pictures of Scrap Reclamation

During Friday afternoon's session a moving picture exhibition illustrating the extent to which reclamation work can be developed was presented by C. H. Hoinville, assistant to general purchasing agent, Atchison, Topeka & Santa Fe. The pictures showed the scope of and the methods employed at the Corwith, Chicago, scrap reclamation plant of the Santa Fe system, which was developed by and is under the jurisdiction of M. J. Collins, general purchasing agent. In connection with the pictures attention was called to the fact that during the Railroad Administration control this reclamation plant was a source of supply of a large amount of material, a quantity of re-rolled iron having been shipped to other roads. A number of other roads also shipped broken and worn material to Corwith, where it was repaired.

The pictures follow the progress of producing re-rolled iron from the receipt of the material at the yards to the stock piles, showing the unloading of the material by cranes, the sorting and classification of material after it has been unloaded, the cutting up and piling of the scrap ready for the furnaces and the rolling process. The pictures also illustrated the repairing of brake beams, cutting worn tires off of truck wheels preparatory to retiring the steel centers, as well as a number of pictures of various classes of reclaimed material.

Supply Train Operation

It is the recommendation of the committee that the following paragraph be added to the original report of last year:

"In addition to the previous recommendations as to the operation of supply trains, it should be understood that on branches or in territory where conditions do not warrant the operation of a train, the service should be modified and a regular supply car substituted, local supervision to determine the frequency. Such a car should be accompanied by the proper stores officer."

It is recommended that Exhibit A, showing service performed by supply train, be made standard practice where supply train service is inaugurated. (Exhibit A is a form for showing the service performed by the supply train. It lists for each division and each month the value of material picked up or recovered and the total credits, the value of material delivered, the per cent of salvage and the per cent of car days saved.)

It has been demonstrated that the supply train can be operated successfully in congested territory and it is being effectively operated on an eight-track railroad.

One of the important results of the supply train is the reduction of stocks on line; rail, new and second-hand and scrap; switch ties; track fittings; frogs; cattle guards; emergency stocks; charged out stocks; all unapplied material, and scrap. It also results in better care of material, consolidation of all material—joints, tie plates, etc.—on each section at tool houses for monthly inventory and check by supply train.

The supply train makes for good housekeeping on the property. The committee feels that figures should be produced showing comparison on various railroads between the cost of distributing supplies under the former system and with a supply train but it has not been successful in obtaining complete data on this subject.

The operation of the supply train is flexible, so that it can readily be adjusted to meet the requirements of a congested main line division of a branch line with light traffic. As conditions change and demand for material and supplies falls

off, the organization on a supply train can be reduced to one man, if necessary, and the disbursements reduced to such essential items as oil, switch and signal lamp supplies, etc. The saving in the distribution of oil alone by supply train as compared with the old method of distributing by local freight is worth the operation of a supply train regularly each month, and when business is light and purchases restricted there is even greater necessity of knowing what is disbursed along the road and in gathering up surplus.

During the past year we have knowledge of three railroads that have installed supply trains based on the report of this committee approved at our first annual meeting. The committee has in its possession letters commenting upon the efficiency and desirability of the service and of the supply train for the information of anyone desiring to review them.

A. S. McKelligon was chairman of the committee.

DISCUSSION

The outstanding feature in the discussion of this report was the experience of a number of roads on which the supply train had been adopted during the past year and the success attending its operation as an economy measure during the recent business depression.

On the Northern Pacific its use has met with great success, where it has won the whole-hearted support of operating and maintenance officers. On other roads, because it looks like an additional operating expense, its use has been curtailed and in some cases discontinued. A number of such cases were mentioned, however, where it has again been reinstated after a month or two of experience under the old method of shipment or supply car distribution. Members who have investigated the Southern Pacific's practice as presented before the division at Atlantic City last year endorse all that was said in favor of supply train operation at that time.

The additions to the standard practice adopted last year as recommended by the committee were adopted.

Reclamation of Material

The committee (W. Davidson, General Storekeeper, Ill. Cen., chairman) has not been able to locate any new process other than covered in previous reports. However, it is noticeable that all railroads are reclaiming very closely. Investigations of scrap being disposed of by sale shows a considerable improvement over previous years. This would indicate that every available piece of material that is eligible for reclaiming is being set aside and worked up. Officers interested should go into this personally, especially at this time, when, with the high cost of material and high price of labor, almost any kind of reclaiming operation is beneficial.

Competent supervision is the most necessary adjunct to successful reclamation. The man to whom the operation of the reclamation plant is entrusted should be one who has been thoroughly trained along these lines. He should be thoroughly familiar with the various classes of material handled on the railroad, so that he can direct this work economically and effectively, eliminating operations from which no profit is derived.

The men who watch the scrap piles should know the values of new materials and at the same time be sufficiently familiar with the various operations necessary to reclaim each class of material that nothing may be salvaged except such material as can be reclaimed with profit.

One of the new features in reclamation, and one which is being developed rapidly, is the welding of materials by the electric or oxy-acetylene process of welding. The success of these processes depends to a great extent on having competent operators, and requires constant personal supervision on the part of the officer in charge to see that proper facilities are provided and a sufficient amount of each class

of work is kept available for reclamation convenient to the operators. It is recommended that attention be paid to facilities for pre-heating, as this important feature at a small cost greatly lessens the cost of welding. These pre-heating furnaces are also of a great deal of value in annealing work after it has been welded, thus preventing fractures from stresses caused by expansion and contraction.

Successful reclamation cannot be carried on without the interest of all concerned, especially the users of the material. Each member should take steps to keep the management of the railroad he represents informed from time to time of the savings made as well as the various processes developed, for by thus stimulating this interest they will not only reflect credit on their organization but will secure the assistance from the heads of other departments which is so necessary to make successful reclamation as a whole.

DISCUSSION

The discussion indicated that not many roads are using large rolling mills but a great many roads are equipped with small rolling mills for reducing the size of scrap rounds and flats. The Southern Pacific has carried on extensive reclamation and rolling mill operations for many years, the long distance from the market making these operations particularly advantageous on this road.

The importance of knowing exact costs of reclamation plant operation, including all items of overhead, and checking closely against prices of new materials was emphasized. Several roads are now endeavoring to keep all possible material away from the scrap dock, concentrating on efforts to save all possible reclaimable material at the points of origin.

Rules for Carrying Out Section X,

Clayton Anti-Trust Act

The committee formally presented a report which has already been issued to all the carriers in circular form under date of November 29, 1920. The plan proposed by the committee recommends that the purchasing officers of each carrier prepare a complete list of the corporations, firms and parties, with whom it is probable it will have dealings aggregating \$50,000 or more during the year, and that these lists be forwarded to the secretary of the carrier by the purchasing agent at frequent intervals during the year with the request that the secretary ascertain from the directors, president, manager, purchasing or selling officer or agent, whether or not

they have any substantial interest in any of the concerns listed, informing the purchasing officer of the facts whenever required by him. A number of forms were submitted by the committee to facilitate carrying out this plan.

H. B. Spencer was chairman of the committee.

Other Reports

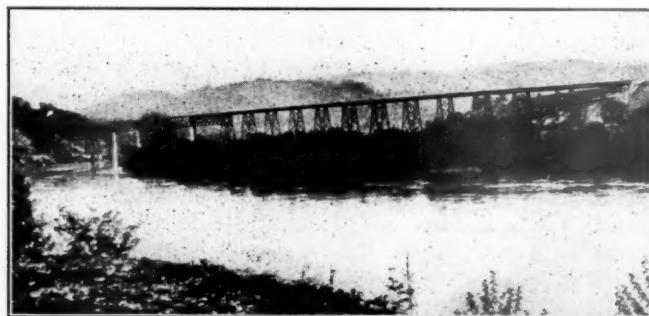
Reports were also presented on Cross-ties—Purchasing, Inspection and Distribution and by the joint committee of the operating, mechanical and purchases and stores divisions on fuel conservation. An abstract of the first of these reports will appear in a later issue.

The report on Lumber—Specifications, Purchasing, Inspection, Storage and Distribution was presented by William Beatty, chairman. An abstract of this paper will be presented in a later issue.

Reports on "Buildings and Structures" and "Scrap Classification—Handling and Sales" were also presented and will be reviewed in next week's issue.

Election of Officers

The following officers were elected to serve for the coming year: Chairman, H. E. Ray, Atchison, Topeka & Santa Fe; vice chairman, F. D. Reed, Chicago, Rock Island & Pacific; members of the executive committee: U. K. Hall, Union Pacific; W. A. Hopkins, Missouri Pacific; H. C. Pearce, Chesapeake & Ohio; E. W. Thornley, Baltimore & Ohio; S. B. Wight, New York Central; D. C. Curtis, Chicago, Milwaukee & St. Paul; and E. J. McVeigh, Grand Trunk.



The Virginian's Longest Bridge—the Glen Lyn Bridge, 2,155 Ft. in Length

The Mechanical Division Meeting Postponed

Word Was Received After Paper Was On Press That
Meeting Will Be Held June 29-30

UNDER date of June 10 the American Railway Association, Mechanical Division, issued a circular announcing the postponement of the annual meeting which was to have been held at the Drake Hotel, Chicago, on June 15 and 16. Following is text of the circular:

"Owing to present unusual conditions and inability of members to attend the meeting of the Mechanical Division, American Railway Association, called to be held in this city

(Chicago), Wednesday and Thursday, June 15 and 16, 1921, the meeting has been postponed to Wednesday and Thursday, June 29 and 30, 1921.

"The sessions will be held at the Blackstone Hotel, Chicago, instead of at the Drake Hotel, as originally planned. It is suggested that members arrange for their hotel reservations without delay."

The *Railway Age* will publish a complete account of this meeting in its issue of July 1.

Gasoline Driven Motor Omnibus for Railroads

Low Cost of Operation and Large Seating Capacity Characterize
Equipment for Branch Line Service

THE PROBLEM of providing frequent service on branch lines has been given careful attention by roads operating in sparsely settled sections of the country. Operating and traffic officers realize that in many cases a revision of schedules to provide more service shows surprising results in increasing passenger traffic. Past efforts to establish service on more or less frequent schedules on branch lines have not been wholly successful due to the lack of suitable rolling stock. The economical operation of such service requires a car that can be operated at low cost, readily and cheaply maintained and not requiring an excessive initial investment.

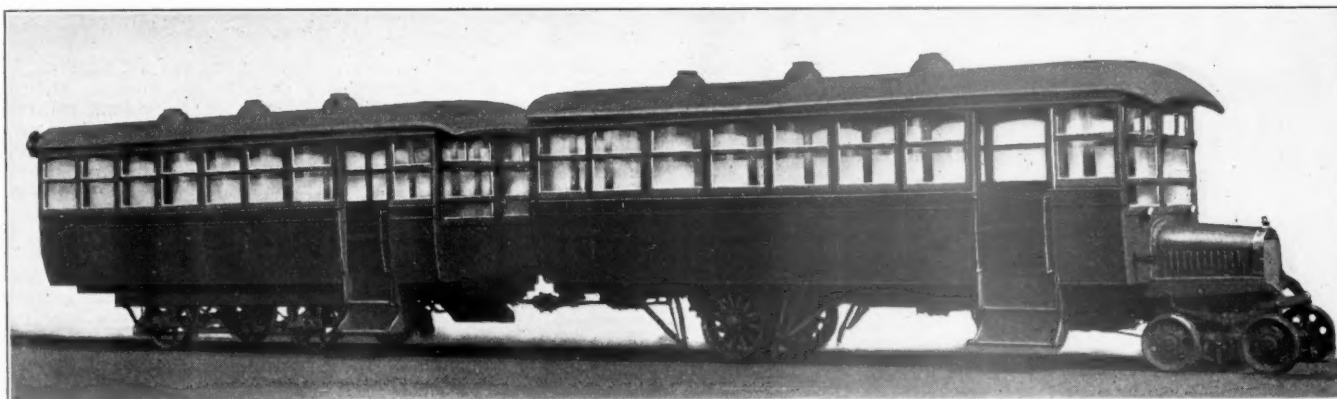
A motor driven omnibus which is intended to fulfil these requirements has been developed by the J. G. Brill Company, Philadelphia, and is now being installed on various roads. A two car unit, consisting of a motor car and trailer, is shown in the illustration. The extent to which this equipment can be substituted for the steam locomotive and coach on branch or short main lines depends, of course, on local conditions, but where this is feasible, the possibilities of the motor omnibus in making branch steam lines more of a success financially are so great that a thorough investigation of

car is mounted on a 2½ ton Mack truck chassis having four transmission speeds both forward and reverse.

The chassis is equipped with flanged rear wheels for rail service and the front end is mounted on a specially designed pony truck. This pony truck adheres better to the rails under high rates of speed, especially on curves, and consequently more comfortable riding action is one of the results obtained.

In addition to the system of brakes on the small pony front truck, which is controlled through the shaft and wheel used for steering in regular motor bus practice, the speed can be retarded by the application of brakes on the rear wheels and also on the transmission. Convenient to the operator's position there is a foot pedal which controls the operation of the brakes on the rear wheel and to his right is a lever which applies the transmission brake.

The car body was constructed according to the best body building practice with a composite underframe of ash side and end sills and crossings of 3-in. steel channels. Ash corner and side posts are used in the superstructure with No. 18 sheet-steel side sheathing up to the belt rail. The body meas-



Motor Omnibus and Trailer

the field is warranted. While these cars have been in service for some time, actual figures as to the cost of operation per mile compiled by one railroad are of little value to others due principally to the wide diversity of operating conditions. It may be said, however, that in no case where these cars have been placed in operation has the cost per mile exceeded 30 cents. Where the excessively high operating costs of the steam locomotive and coach make the continuation of service almost prohibitive, the substitution of the gasoline rail car with trailer will not only permit the same service at less cost, but offers an opportunity to improve the service and earnings. Provision may be made for the handling of baggage and express either in conjunction with the motor car or on a special trailer designed for the purpose.

With this type of vehicle a maximum speed of 30 miles per hour may be attained, and when required the trailer will carry a load at least equal to the load of the motor car without materially decreasing the speed of the latter.

Construction of the Car

A single motor car, similar to the front unit shown in the illustration, was built for the Chesapeake Western, a 40-mile line operating between Elkton and Stokesville, Virginia. This

ures 21 ft. 11 in. long over corner posts and 7 ft. 10½ in. wide over side posts at belt rail. It has a seating capacity of 31 passengers. Eight standard Brill light-weight "Waylo" stationary seats, two side longitudinal seats for four passengers each, a long seat extending completely across the rear end for six passengers and one single corner longitudinal seat, all upholstered in Brill twill-woven seating rattan, constitute the available seating space for passengers.

The interior is of a sanitary ash finish with roof carlines showing, and in appearance greatly resembles the electric street car, the seats, floor mat strips, ventilators, hand straps attached to ceiling and many other details conforming to the equipment and construction characteristic of that type of vehicle. All side and end windows are of the double type, the upper part being stationary and the lower arranged to drop into pockets. The front is enclosed with a wind shield which is hinged and opens outwardly.

The two-leaf folding doors which enclose the door opening on each side of the forward end are controlled by manually operated levers located in front of the operator's position, a separate lever being used for each set of doors. As in regular motor omnibus practice the heating of the motor car is through the exhaust from the engine. The roof is of the

plain arch type and contains three standard Brill Exhaust ventilators.

Under the rear end, strapped to the bottom of the under-frame, is a large wooden box with hinged cover and lock for the hauling of luggage.

The small pivotal pony truck under the forward end is constructed of commercial steel shapes and has a 3-ft. wheel base. It is equipped with 20-in. diameter wheels having A. R. A. standard width tread and thickness of flange. The distance between the rear axle and the center of this pony truck is 16 ft. 6 in. A pilot is attached to the front end of the chassis as a safeguard against obstructions on the rails which might cause derailment.

The motor and trailer illustrated was constructed for the U. S. Engineers for operation at Camp A. A. Humphrey, Va. The motor bus is practically the same as heretofore described with the baggage box and front pilot eliminated. The trailer is of the same dimensions as the motor car and similar in many details. The latter has a seating capacity of 35 due to the fact that there is no operating mechanism in the for-



The Interior Finish Conforms to Standard Street Railway Practice

ward end, making the combined seating capacity of the two-car unit 66 passengers, which is larger than the capacity of the usual steam coach. Directly in front of the seat across the forward end is an emergency brake staff and drop ratchet handle. This trailer is mounted on a Brill type of special running gear, equipped with 30-in. diameter wheels and having an 8-ft. wheel base, which has been in operation on many street railways in the United States and abroad. The two busses are coupled together by a Brill Radial drawbar and a signal cord extends through both busses enabling the conductor on the trailer to signal the driver of the motor driven bus.

As economical operation was primarily the reason for the development of this gasoline-driven railroad motor omnibus and trailer, and as the number of miles per gallon of gasoline is influenced largely by the weight moved every effort was made to secure the lightest construction for the service. Consequently, the motor car complete weighs approximately 12,000 lb. and the trailer car complete about 6,000 lb. One motor car in regular service averaged as high as 14 miles per gallon of gasoline.

THE WASHINGTON-NEW YORK air mail route has been abandoned. Postmaster General Hays announced that urgent necessity for economy and the fact that means of continuing the department's experiments with air mails would be afforded by the New York-San Francisco route, were the reasons for the discontinuance.

Security Owners Appoint Committee To Study Railroad Problems

THE NATIONAL ASSOCIATION of Owners of Railroad Securities announced on June 6 the appointment of a committee, to be known as the "Board of Economics and Engineering," to investigate the possibility of effecting substantial economies in the operation of the railroads. The personnel of the board includes John F. Stevens, F. A. Molitor, John F. Wallace, W. L. Darling, L. B. Stillwell and W. W. Colpitts.

The security owners are, according to the statement of the association, "greatly concerned in the present situation" of the railroads. The reasons given are: "The interest on the bonds of the railroads generally is not being earned. On the government's valuation of the railroads they will be taken into larger consolidated systems under the Esch-Cummins Act. . . . This procedure and the conditions obtaining will have their effect on the value of railroad securities. The general demoralization incident to poor business, low earnings, high operating costs, movement for reduced rates, the valuations and proposed consolidations, together with the friction between the railroads and their employees . . . is far from reassuring."

The executive committee of the association expresses itself as believing that "substantial economies are necessary and can be secured through co-ordination by the carriers affecting group organization of the railroads in the four territories the Interstate Commerce Commission has laid out."

The statement of S. Davies Warfield, president of the association, in appointing the committee, follows in part:

No member of the Board of Economics and Engineering is connected with a railroad company or with any financial institution. The board is unhampered by ties of individual, railroad or financial identity or ownership, or by the influences of any particular security owning or banking group; it is free from the environment that attends governmental appointment. It can pursue its investigations and reach conclusions solely with the purpose of securing the substantial economies that can be made in the public interest, only possible of attainment by those in position to view the transportation system as a whole. The same results cannot be expected to be attained through voluntary agencies, associations or instrumentalities composed of officials or individual railroads or systems, surrounded by the compelling influences that are necessarily entailed upon those who represent the competitive interests of their respective railroads.

The railroads have been organized and are operated under highly competitive methods of administration. And while competition should be encouraged and provided for between the railroad systems, it must be kept within reasonable limits and the results of competitive service obtained without the wastefulness that is unavoidable under the present system under which transportation by rail is conducted. No other instrumentality for carrying out the full purposes contemplated by the Esch-Cummins Act in respect to economies or consolidations could be devised that would be so free to co-operate with the commission and the railroads in solving, in the public interest, the problems now confronting the railroads, as this Board of Economics and Engineering, constituted and appointed as it has been. The experience of the members of this board in economic investigations and railroad construction and operation has been exceptionally broad and varied, and especially qualifies them for the present undertaking.

The Esch-Cummins Act requires that the Interstate Commerce Commission shall see that economies are instituted in railroad administration as a condition to the adjustment of rates to yield "the fair return on the aggregate value of the railroad property."

The representations made before Congress by the security owners of the financial needs of the carriers as essential to maintain transportation, led to the inclusion by Congress in the Esch-Cummins Act of the present financial rate-making provisions.

The committee now believes it becomes the duty of the association to endeavor to assist in providing the means for carrying out the full purposes of the act in respect to intensive economies.

Many railroads are not earning bond interest. Large amounts required for rehabilitating the properties as returned from federal control, their delayed debts and the amounts owing the gov-

ernment all produce conditions that can only be met through intensive economies.

The executive committee of the association and the Board of Engineers believe that co-ordination and joint facility uses can be best secured through the railroads effecting the organization of their groups in the four rate-making territories established by the commission under the Esch-Cummins Act. Failure to produce substantial economies may lead to supplying by taxation part of the costs of railroad operation.

Consolidations of the railroads into a "limited number of railroad systems" is contemplated by the act as a means for economies. In such consolidations "the capital of the consolidated corporations shall not exceed the value of the consolidated properties as determined by the commission."

The valuations now being made by the government will form the basis of value at which the roads will be taken into the "limited number of systems" called for by the act. They will also determine the aggregate value of the roads comprising each group upon which the return from rates is computed. Upon the proper determination of these and other questions depends the value of railroad securities owned by millions of people, very largely represented by this association.

The board will be of material service in the solution of all these problems.

All of the members of the newly appointed board are men of considerable experience in railroad work. Mr. Stevens has served as a vice-president of the Chicago, Rock Island & Pacific and the New York, New Haven & Hartford and as president of the Spokane, Portland & Seattle. He was chief engineer of the Panama Canal and a member of the American railroad commission in Russia during the war. Mr. Wallace was at one time vice-president of the Kansas City, Mexico & Orient and from 1914 until his present appointment has been chairman of the Chicago Railway Terminal Commission. Mr. Darling was for a number of years chief engineer of the Northern Pacific and was also a member of the American railroad mission to Russia. Col. Molitor, Mr. Stillwell and Mr. Colpitts are consulting engineers with considerable experience in dealing with railroad problems.

Building Material Rates to Stand

WASHINGTON, D. C.

AT A SERIES of conferences held in Washington on June 2 and 3, between the traffic executives of important rail carriers and representatives of associations and shippers interested in the movement of sand, gravel, crushed stone, chert, slag, asphalt, tar, paving brick, cement, yellow pine lumber, short-leaf pine, lumber, redwood, fir, hemlock, oak, gum, cottonwood, and other hardwood lumber, logs, building brick, tile, terra cotta, talc, and other building materials, the carriers were urged by representatives of the building tile and building brick interests to reduce the rates on these commodities by eliminating the advance of 40 cents per ton established under General Order 28 and applying the percentage advance under Ex Parte 74 to the rates in force prior to General Order 28. Representatives of other shipping interests asked for a reduction equalling the entire advance authorized by the commission in Ex Parte 74. The tonnage directly affected by these requests approximates 25 per cent of the total tonnage of the railways.

A statement was issued by the Association of Railway Executives on June 8 announcing that "after a most careful consideration of the situation as presented by the shippers, and of the present and prospective financial conditions of the carriers, the representatives of the carriers concluded that under existing conditions no general reduction in freight rates can be justified or made effective, and that the carriers are in no condition to accept the far-reaching consequences of the reductions requested at these conferences. carriers themselves, by impairing their ability to continue to work towards a lower level of rates, but it is manifest that this result cannot be accomplished until there is such a reduc-

tion in operating costs and increase of business as will restore the proper relation of net to gross earnings.

"It cannot be overlooked that there are many articles analogous to those above mentioned, on which the demand and the equity of reduced rates could be equally as pressing and as great as they are with respect to the commodities mentioned, and it would be difficult, if not impossible, to prevent the inclusion of these analogous articles in any reduction in rates such as is now requested. Thus substantially more than the 25 per cent of the total tonnage of the railroads above mentioned would be either directly or indirectly involved in the requested reductions. The seriousness to the carriers of the proposal is thus evident.

"The conferences developed that, while, in the opinion of various shippers reductions in freight rates would stimulate the movement of these commodities, the fact remained that this was altogether conjecture, and that there was no assurance that any reduction in freight rates would substantially increase the movement of this traffic. It was admitted that reductions in the selling prices of some of the commodities mentioned, far exceeding the present total freight charges, had failed to create any broader markets. It was also clearly brought out that the hope of reductions in freight rates has resulted in hesitancy on the part of consumers and dealers to place orders, and because of this it was urged that carriers promptly announce their conclusion in order that the present uncertainty may be cleared up."

In notifying the shippers of this action, the carriers stated: "No industry in the country is in more acute distress than are the railroads. Many are not earning their operating expenses and taxes, many more are not earning interest charges, and no group of railroads is earning anything approximating the return contemplated by the Transportation Act to enable them to provide the facilities necessary to accommodate the normal commerce of the country.

"Obviously, therefore, the carriers cannot afford to make any general reduction in rates, nor even the reductions that would follow from the acceptance of shippers' proposals.

"The reduction in wages recently authorized by the Labor Board, but not yet realized, is more than offset by the decreased volume of business due to world-wide conditions affecting, generally speaking, all business and all interests. This traffic does not now produce, even under the advanced level of rates, a margin of profit anywhere near sufficient to meet the universally recognized needs of the carriers. It is a fact that the increases allowed by the Interstate Commerce Commission in August, 1920, in response to the provisions of the Transportation Act, are yielding the carriers less by \$622,000,000 than the return contemplated by this Act; there has been no estimate, from any source, that the recent wage reduction will even approximate that figure.

"The carriers are vitally interested in any changes which will produce needed revenue and would be justified in considering reductions could they have any reasonable assurance that the volume of traffic would be augmented sufficiently to increase their net return. However, the arguments presented indicate that even in the minds of the shippers the result of any substantial reduction in rates is purely speculative not only as to increased volume of traffic but also as to the time when an increased volume of traffic may be expected. It should be universally recognized that the carriers are in no condition to enter the field of uncertain experimentation substantially involving their revenues, for the reason that disappointment in the experiment would result in serious consequences to the public, as well as to the furnish needed transportation to the commercial public.

"It must not be overlooked that the carriers have realized that the percentage increases in rates produced inequalities and in many instances threw rates out of line, and to correct these conditions they have been and are diligently adjusting such situations. . . ."

General News Department

The Missouri, Kansas & Texas has opened an office in the City of Mexico at 24 Avenue Del Cinco De Mayo, in charge of Juan D. Noriega.

The International Railway General Foremen's Association has decided to cancel its 1921 convention which was to have been held September 12, 13, 14 and 15 at the Hotel Sherman, Chicago, owing to the financial stress and serious business conditions.

The first of five Pacific type passenger locomotives now being built in the Reading shops of the Philadelphia & Reading has recently made a trial trip. The four additional engines will be completed and put into service this summer. The engines of this class have a tractive effort of 39,046 lb., and a total weight in working order, exclusive of tender, of 273,600 lb.

The Railroad Training School at Elmira, N. Y., which is fostered by the Erie Railroad, and which teaches telegraphy and all kinds of work required in a small railroad station, now receives women as well as men. Under proper regulations the tuition is free. The age limit for entrants is 17 to 30. The manager is L. J. Baird.

The Pullman shop employees throughout the country, through the system federation, are taking a strike vote to be turned in on June 10. The ballot is being taken because the employees claim the company has not obeyed the decision of the Railroad Labor Board ordering the company to confer with the employees with a view to an agreement on rules and working conditions to take the place of the national agreements.

Preliminary compilations of railway returns for the month of April show a slightly smaller net income than that reported for March. For 196 roads the net operating income was \$25,318,000 as compared with a deficit of \$24,157,000 for April, 1920. The operating revenues were \$411,000,000 as compared with \$381,000,000 last year, while the operating expenses show a reduction; \$359,000,000 as compared with \$381,000,000 last year.

The Senate committee on interstate commerce has decided to hold a hearing on the bill introduced by Senator Cummins to strike out of the valuation act the provision requiring the Interstate Commerce Commission to report the cost of purchase or of condemnation of lands. The committee will allow a short time to W. G. Brantley, representing the railroads, J. E. Benton, representing the state commissions, and a representative of the Interstate Commerce Commission to present their views.

The Interstate Commerce Commission has announced a supplemental tentative valuation of the property of the Chicago, Terre Haute & Southeastern as of June 30, 1916, in which it finds the final value of the property owned and used to be \$20,502,223. This includes \$2,223 for property leased from private parties and \$580,924 on account of working capital and materials and supplies; and the commission reports the present costs of condemnation and damages or of purchase of lands in excess of the present value as \$1,053,557.

The American Foundrymen's Association has postponed the date of its convention and exhibit from October, 1921, to April or May, 1922. This decision does not reflect a lack of confidence in the revival of business in the foundry industry in the near future, for all of the members of the executive committee, at the time of the decision, felt that conditions would be sufficiently improved in the Fall to justify the usual convention and exhibit. It was found, however, that in none

of the eight cities considered was it possible to find, during September or October, adequate hotel accommodation and exhibit facilities. It was therefore deemed advisable to defer the convention till Spring.

H. C. Bixler, for the last three years superintendent of the Manhattan division of the Pennsylvania Railroad, has been appointed transportation engineer for the Port of New York Authority, office at 11 Broadway, New York City. Mr. Bixler was in the service of the Pennsylvania about 33 years, having begun as telegrapher on the Pittsburgh division. In 1891 he was appointed train despatcher and later assistant trainmaster on the Pittsburgh division. In November, 1909, he was appointed trainmaster of the New York Terminal division and was in that position when the passenger terminal at Thirty-third street was organized and opened for business. Two years later he was promoted to be assistant superintendent of the Philadelphia Terminal division, later becoming superintendent of stations and transfers, with authority over the whole road. From that position he was called back, in 1918, as above noted, to New York City. In this position he had charge of the marine department, the freight piers and stations, the Manhattan division having little or no main line territory. Here, as well as in his last position at Philadelphia, Mr. Bixler had occasion to study all kinds of freight terminal problems. He installed tractors and trailers and other machinery on the New York City piers. He was also on a committee of the American Railway Association which made a study of freight handling at important cities throughout the country.

Superintendents' Association

Owing to the unusual conditions existing on the railways at the present time, the executive committee of the American Association of Railroad Superintendents has deemed it advisable to postpone the 1921 convention which was to have been held in Kansas City, Missouri, on August 24, 25 and 26.

Grand Trunk Loses Suit

The court of appeals of the District of Columbia on June 5 affirmed the action of the supreme court of the District of Columbia in denying a mandamus asked by the Grand Trunk Western to compel the Secretary of the Treasury to issue a warrant for \$500,000 on a certificate of the Interstate Commerce Commission for a partial payment on account of its guaranty for the six months following the period of federal control. Since this action was instituted, Congress has specifically authorized such partial payments to the railroads in advance of final settlement by the passage of the Winslow bill.

Progress in Store Door Delivery

The establishment of store door delivery throughout the country for the relief of terminal congestion and for improving transportation is showing some progress. Upon recommendation of the Federal Highway Council a committee representing the shippers and carriers of Baltimore, Md., has been appointed to work out the details for operating such a system in Baltimore. It has already been decided to undertake such a service. The committee appointed consists of A. E. Beck, chairman and representative of the Federal Highway Council and the Merchants and Manufacturers Association of Baltimore; for the shippers: George P. Neilson, superintendent, American Wholesale Corporation; James M. Easter, president, Daniel Miller Company; Walter Halstein, president, Baltimore Transfer Company; and Robert A. Masson, Masson Transfer Company; for the railroads: Pennsylvania—G. M. Smith, superintendent; S. T. Stackpole, division freight agent;

J. S. Corcoran, freight agent, and F. W. B. Humes, superintendent, stations and transfers; Western Maryland—J. M. Allison, freight traffic manager; C. F. Eckhart, agent, and T. E. Withers, manager of warehouses; Baltimore & Ohio—Golden Shumate, freight traffic manager; W. E. Neilson, freight agent, Camden station; M. F. Steinberger, special engineer, operating department, and J. C. Brown, manager, Blue Line Transfer Company.

John Fritz Medal Goes to France

The John Fritz medal and diploma, the highest honor bestowed by American engineers, has been awarded to Charles Prosper Eugene Schneider, the distinguished French engineer and scientist and head of the great Creusot engineering and steel works of France. The following cable has been sent to his home in Paris:

"John Fritz Medal Board of Award, representing national societies of civil, mining and metallurgical, mechanical and electrical engineers, has awarded you the John Fritz Gold Medal for achievement in metallurgy of iron and steel; for development of ordinance, especially the 75-mm. gun, and for notable patriotic contribution to the winning of the war.

The medal and diploma will be presented to Mr. Schneider by a party of prominent American engineers, led by Ambrose Swasey, chairman of the board of award.

Operating Statistics for March

The bulletin of operating statistics for the month of March issued by the Interstate Commerce Commission shows that the records in car efficiency made by the railroads last year are not being maintained during the period of depression in traffic. The miles per car day for March averaged 20.9 as compared with 24 in March, 1920; the net tons per loaded car averaged 27.2 as compared with 28.1, and the net ton miles per car day averaged 359 as compared with 487. The number of cars per train averaged 37.4 as against 35.6, but the net tons per train were only 626 as compared with 703 last year. The train speed per car shows an increase from 10.1 miles an hour in March last year to 11.4. While the percentage of unserviceable freight cars shows a considerable increase, the percentage of unserviceable locomotives, on the other hand, shows a decrease from 25.7 last year to 23.1 this year.

The Burden of Taxation

"Taxation is the greatest burden industry has today," said Paul Shoup, vice-president of the Southern Pacific Company, in a recent address before the California Bankers' Association at San Diego. Mr. Shoup cited the Southern Pacific Company as an example of industry handicapped by high taxation. "The Southern Pacific Company," he said, "had in 1912, before payment of taxes, interest and other fixed charges, or dividends apportioned to California on the accepted basis, \$23,556,970 of its earnings, out of which in the succeeding fiscal year it paid to the State of California on its property devoted to public service, \$2,954,084 in taxes. In 1920, its earnings apportioned to California on the same basis were \$19,364,560, out of which it will have to pay in the succeeding fiscal year under the new tax laws, \$8,167,000. The ability of the company to give service is impaired, and its consequent inability to reduce freight rates and passenger fares in turn has its effect on other industries."

Black Tom Damage Suits

The United States Supreme Court on June 5 declined to grant a writ of certiorari providing for a review of the decisions of New York and New Jersey courts which held the Lehigh Valley Railroad liable for damages caused in the explosion of munitions at Black Tom Island, New York harbor, in July, 1916.

At Trenton, N. J., on June 7, the Supreme Court of New Jersey, affirming a decision of the county court, decided in favor of the Lehigh Valley in suits brought by the King of England, the Republic of France and the Aetna Explosives Company. These suits had been brought for losses due to the explosion, including considerable quantities of munitions which were on barges, and smaller quantities which were in cars on tracks of the Central Railroad of New Jersey, adjacent to the Lehigh Valley dock; and the present decision is

to the effect that the Lehigh Valley is not responsible for these losses, which did not occur on its own premises. In the case of the barges, it is held that they had no business to be at that place at the time of the explosion. Of the sum demanded by France (over one million dollars) about \$122,566 was allowed; and this partial award to France has been made the basis of an appeal by the railroad company to the Court of Errors and Appeal.

Report on Elimination of Waste

The special committee on the elimination of waste in industry appointed by Herbert Hoover while president of American Engineering Council presented its report at the meeting of the executive board of the council at St. Louis, Mo., on June 3. The report as presented was not accepted as final, but was referred back to the committee for revision. It dealt with housing and building, men's ready made clothing, shoes, metal trades and printing industries and its findings show that "waste results from an interruption of production, low production, restriction of production and lost production," of which "over 50 per cent of the responsibilities for these wastes can be placed at the door of management and less than 25 per cent at the door of labor." The report covers in detail many of the abuses found in all industries both on the side of the managements and on the side of labor while recommendations for elimination of waste and also an outline for governmental assistance were likewise submitted in the report.

Mr. Ford's Railroad Raises Pay

Henry Ford, president of the Detroit, Toledo & Ironton Railroad (463 miles, 75 locomotives), announces that from July 1 the minimum daily wage rate of six dollars, now prevailing in the Ford factories, will be extended to all employees of the railroad, with bonuses for demonstrated efficiency. Railroad employees will work only six days a week, the same as workmen in other industries. From 6 p. m. Saturday to 6 a. m. Monday not a wheel will move on train or in shop, except the minimum required to move milk trains. "We are trying to put this railroad on a factory basis," said Mr. Ford. "We are going to work the railroad six days a week, with eight-hour shifts, and rest on the seventh day. We believe it will mean better service to the public. . . . In one month, with a reduced revenue of \$100,000, we showed a profit on our operations, where formerly there had been a \$200,000 deficit."

Off-line commercial agencies are to be closed on July 1 and all traffic solicitation will be managed from the general office in Detroit.

Organization of Technical War Service Officers

In connection with the organization, under the direction of General Pershing, of the reserve armies of the United States, it is proposed to associate informally members of the Army Ordnance Association and the ordnance officers of the Reserve Corps. The membership of the Army Ordnance Association, of which Benedict Crowell is president, is comprised of some 2,400 technical and business experts who, during the war, served either as officers of the Ordnance Department or as executives of industries engaged in ordnance manufacture. For the purpose of offering assistance in the organization of the Reserve Armies and in the solution of local war plans, it is now proposed to form in the metropolitan district of New York, a local organization of the Army Ordnance Association to include as members all ordnance officers of the Officers' Reserve Corps.

There will be a meeting for this purpose at the Engineering Societies' Building, 29 West 39th street, at 8 p. m., Wednesday, June 15. Short addresses will be made by Maj. Gen. C. C. Williams, Chief of Ordnance; Maj. Gen. Robert L. Bullard, Commanding General of Second Corps Area; Brig. Gen. William Weigel, Chief of Staff, Second Corps Area; Col. Samuel G. Shartle, Assistant Chief of Staff, Second Corps Area; Major M. L. Brett, Office of Assistant Secretary of War, and others. All who served as officers in the Ordnance Department during the war, and all who are interested in Ordnance as a factor in preparedness, are invited to attend.

Operating Statistics of Large Steam Roads—Selected Items for the Month of March, 1921,

FREIGHT SERVICE																
Region, road and year		Average miles of road operated	Train-miles	Locomotive-miles		Car-miles		Per cent loaded	Ten-miles (thousands)		Locomotives on line daily					
				Principal and helper	Light	Loaded (thousands)	Empty (thousands)		Gross, Excluding locomotive and tender	Net, Revenue and non-revenue	Serv-ice-able	Un-serv-ice-able	Per cent unserv-ice-able	Stored		
New England region:																
Boston & Albany.....	1921	394	245,063	265,024	30,843	4,383	2,554	63.2	242,972	98,792	122	28	18.7	...		
	1920	394	281,722	300,666	32,363	5,260	1,426	78.7	254,104	116,967	124	32	20.5	...		
Boston & Maine.....	1921	2,481	528,993	588,602	56,960	10,607	5,325	66.6	584,925	246,386	344	116	25.2	62		
	1920	2,482	650,986	715,517	66,477	12,050	3,243	78.8	604,056	278,025	332	118	26.2	4		
N. Y., N. H. & H.....	1921	1,959	457,981	492,227	32,812	10,254	5,093	66.8	542,974	234,100	297	73	19.7	27		
	1920	1,938	505,547	523,664	41,723	10,781	2,870	79.0	520,583	246,124	284	112	28.3	...		
Great Lakes region:																
Delaware & Hudson.....	1921	880	360,541	477,570	33,731	8,475	5,958	58.6	585,381	290,005	277	35	11.2	90		
	1920	858	389,346	547,580	39,924	9,513	4,179	69.5	620,870	324,998	252	37	12.8	15		
Del., Lack. & Western.....	1921	997	500,996	615,991	118,608	14,860	7,292	67.1	841,751	394,679	333	47	12.4	60		
	1920	997	542,777	691,814	157,417	17,183	5,331	76.3	923,920	474,055	287	66	18.7	5		
Erie (inc. Chic. & Erie).....	1921	2,259	941,628	1,051,137	51,797	27,773	16,949	62.1	1,751,365	800,201	563	149	20.9	76		
	1920	2,259	1,123,919	1,268,001	41,883	35,810	11,706	75.4	2,070,654	1,060,642	556	131	19.1	17		
Lehigh Valley.....	1921	1,431	524,728	579,199	52,756	14,000	8,699	61.7	870,208	402,144	403	129	24.2	116		
	1920	1,429	651,874	733,041	69,197	18,669	6,206	75.1	1,051,383	535,169	376	167	30.8	40		
Michigan Central.....	1921	1,829	438,646	455,279	15,753	12,462	7,604	62.1	686,992	274,414	328	91	21.7	107		
	1920	1,826	587,703	632,313	18,100	20,393	4,975	80.4	1,012,995	486,664	335	83	19.9	0		
New York Central.....	1921	5,646	1,663,015	1,802,905	135,055	53,697	33,423	61.6	3,169,363	1,357,675	1,140	498	30.4	355		
	1920	5,646	2,299,987	2,599,537	185,793	78,412	29,214	72.9	4,319,208	2,136,423	(1)	(1)	(1)	(1)		
N. Y., Chic. & St. L.....	1921	572	332,083	332,831	568	9,408	5,000	65.3	499,362	198,278	110	58	34.5	33		
	1920	573	375,859	384,749	1,359	12,285	2,230	84.6	596,727	294,305	104	78	42.9	8		
Pere Marquette.....	1921	2,207	283,977	291,362	5,506	6,814	4,032	62.8	363,680	172,395	171	37	17.9	30		
	1920	2,200	340,195	351,044	6,165	8,486	2,428	77.8	429,475	213,150	148	54	26.8	...		
Pitts. & Lake Erie.....	1921	225	80,635	90,119	608	2,711	1,679	61.8	197,748	110,834	67	12	15.2	23		
	1920	225	157,607	161,764	8,784	5,443	2,674	67.1	385,236	226,306	64	11	14.7	...		
Wabash.....	1921	2,418	541,633	567,344	5,706	14,983	7,148	67.7	808,593	342,916	271	71	20.8	38		
	1920	2,418	627,929	645,284	10,305	17,391	4,240	80.3	866,263	419,205	252	81	24.3	...		
Ohio-Indiana-Allegheny region:																
Baltimore & Ohio.....	1921	5,185	1,606,146	2,002,953	105,653	36,974	25,555	59.1	2,404,102	1,126,325	1,011	389	27.8	220		
	1920	5,154	2,026,689	2,551,607	149,030	55,525	23,284	70.5	3,436,682	1,817,815	1,031	305	22.8	15		
Central of N. J.....	1921	679	260,815	286,954	33,306	5,542	4,062	57.7	381,721	189,089	214	50	18.9	19		
	1920	679	342,266	378,680	44,856	6,922	3,832	64.4	424,441	232,713	210	49	18.9	...		
Chicago & Eastern Ill.....	1921	1,131	207,215	208,424	3,814	4,675	2,770	62.8	277,480	133,921	117	55	32.0	34		
	1920	1,131	320,107	329,161	5,381	7,783	3,999	66.1	474,487	244,534	109	79	42.0	2		
C., C., C. & St. L.....	1921	2,396	644,023	680,884	3,591	16,297	12,289	57.0	1,065,808	481,924	319	115	26.5	20		
	1920	2,393	737,179	769,643	113	22,981	8,408	73.2	1,239,844	607,887	275	116	29.7	...		
Elgin, Joliet & Eastern.....	1921	837	103,296	115,410	8,527	2,971	1,331	69.1	217,581	120,147	101	9	8.2	28		
	1920	833	184,304	213,859	15,367	5,641	2,680	67.8	404,506	222,853	94	14	13.0	...		
Long Island.....	1921	395	42,891	50,262	8,402	549	322	63.6	29,766	11,494	35	8	18.8	3		
	1920	395	44,443	75,091	11,971	572	274	67.6	28,638	12,003	38	13	25.8	...		
Pennsylvania System.....	1921	10,851	3,864,427	4,218,501	304,684	93,616	58,405	61.6	6,387,970	3,169,794	2,510	713	22.1	795		
	1920	10,838	5,054,804	5,628,240	415,804	134,212	57,872	69.9	8,305,175	4,430,137	2,016	985	32.8	6		
Phila. & Reading.....	1921	694	491,435	555,427	68,339	11,635	7,606	60.5	802,401	417,259	341	87	20.3	101		
	1920	690	681,296	786,042	98,844	16,660	8,450	66.3	1,120,834	631,201	302	87	22.4	2		
Pocahontas region:																
Chesapeake & Ohio.....	1921	2,543	638,487	694,505	18,411	17,393	12,432	56.4	1,301,919	674,950	453	107	19.1	98		
	1920	2,517	892,960	978,550	36,786	25,984	15,985	61.9	1,904,374	1,068,530	410	129	24.0	3		
Norfolk & Western.....	1921	2,210	609,173	736,536	25,204	15,672	10,791	59.2	1,192,069	631,195	632	140	18.1	272		
	1920	2,192	797,222	1,011,140	48,698	22,400	12,681	63.9	1,672,350	929,819	436	252	36.6	11		
Southern region:																
Atlantic Coast Line.....	1921	4,888	732,391	734,999	11,879	16,007	9,821	62.6	845,839	317,809	301	119	28.3	2		
	1920	4,892	777,667	780,794	11,865	16,639	7,508	68.9	855,955	348,937	274	125	31.3	...		
Central of Georgia.....	1921	1,908	238,928	240,659	2,125	4,816	2,050	70.1	255,962	117,930	100	24	19.4	...		
	1920	1,913	242,825	245,402	4,758	5,116	1,476	77.6	258,288	125,770	97	27	21.8	...		
I. C. (inc. Y. & M. V.).....	1921	6,151	1,593,682	1,602,604	28,855	37,951	22,200	63.1	2,398,662	1,071,841	745	103	12.1	26		
	1920	6,151	1,913,782	1,923,188	44,061	49,943	21,984	69.4	3,010,033	1,450,492	713	110	13.4	19		
Louisville & Nashville.....	1921	5,026	1,417,797	1,508,970	53,024	23,404	15,806	59.7	1,496,141	688,959	543	115	17.5	28		
	1920	5,024	1,553,864	1,688,487	56,823	28,268	11,225	71.6	1,646,644	836,839	497	135	21.4	...		
Seaboard Air Line.....	1921	3,537	445,247	449,777	6,681	9,039	5,145	63.7	489,353	188,094	179	82	31.4	...		
	1920	3,537	499,977	509,213	9,001	11,550	4,433	72.3	603,462	264,724	191	86	31.1	...		
Southern Ry.....	1921	6,942	1,182,045	1,203,511	26,754	24,876	11,243	68.9	1,284,609	536,772	819	172	17.3	54		
	1920	6,948	1,487,892	1,531,603	52,709	35,941	10,592	77.1	1,791,670	834,153	952	156	14.0	1		
Northwestern region:																
C. & N. W.....	1921	8,320	1,530,047	1,568,924	18,059	29,051	18,291	61.4	1,698,857	657,068	620	331	34.8	4		
	1920	8,062	1,754,717	1,792,282	21,744	38,720	14,507	72.7	2,053,511	920,485	671	243	26.6	4		
C., M. & St. P.....	1921	10,618	1,292,375	1,336,467	61,051	29,620	16,586	64.1	1,605,022	688,860	817	262	24.0	134		
	1920	10,626	1,776,605	1,838,553	79,050	46,320	14,664	76.0	2,382,570	1,161,911	681	281	29.0	1		
C., St. P., M. & O.....	1921	1,726	305,566	328,402	12,613	5,552	2,460	69.3	298,187	118,784	154	51	24.9	28		
	1920	1,726	346,174	368,103	17,877											

Compared with March, 1920, for Roads with Annual Operating Revenues above \$25,000,000*

Region, road and year	FREIGHT SERVICE										Pounds of coal per 1,000		Passenger service		
	Average number of freight cars on line daily			Per cent un-service-able	Gross tons per train, excluding locomotive and tender	Net tons per train	Net tons per car	Net ton miles per car-day	Car-miles per car-day	Net ton miles per mile of road per day	gross ton-miles, including locomotive and tender	Train miles	Passenger train car-miles		
	Home	Foreign	Total												
New England Region:															
Boston & Albany.....	1921	3,323	4,699	8,022	6.6	1,383	992	403	22.5	397	27.9	8,090	208	319,833	2,012,683
	1920	480	10,116	10,596	3.9	....	902	415	22.2	356	20.4	9,578	249	317,681	1,956,896
Boston & Maine.....	1921	17,332	14,877	32,209	16.3	3,934	1,106	466	23.2	247	16.0	3,203	162	866,106	4,570,199
	1920	7,281	32,670	39,951	8.5	....	928	427	23.1	224	12.3	3,614	162	844,908	4,431,585
N. Y., N. H. & H.....	1921	24,495	16,978	41,473	14.4	5,563	1,186	511	22.8	182	11.9	3,854	183	1,096,824	6,695,353
	1920	7,643	42,945	50,588	5.8	....	1,030	487	22.8	157	8.7	4,096	214	1,068,482	6,511,835
Great Lakes Region:															
Delaware & Hudson....	1921	11,976	5,088	17,064	8.7	1,236	1,624	804	34.2	548	27.3	10,626	201	187,876	974,005
	1920	2,866	15,506	18,372	5.1	....	1,595	835	34.2	571	24.0	12,213	221	188,510	912,000
Del., Lack. & Western..	1921	16,216	7,862	24,078	7.8	893	1,690	788	26.6	529	29.7	12,773	183	493,254	3,522,313
	1920	3,171	24,067	27,238	5.4	....	1,702	873	27.6	561	26.7	15,342	...	468,749	3,356,430
Erie (inc. Chic. & Erie)..	1921	35,223	15,996	51,219	16.2	10,809	1,860	650	28.8	504	28.2	11,428	162	674,803	5,078,290
	1920	6,948	52,475	59,423	6.1	....	1,842	944	29.6	576	25.8	15,148	168	711,871	4,948,998
Lehigh Valley.....	1921	29,297	10,318	39,615	11.6	2,725	1,658	766	28.7	328	18.5	9,068	196	362,789	2,718,428
	1920	7,821	34,170	41,991	6.2	....	1,613	821	28.7	411	19.1	12,079	214	374,167	2,619,726
Michigan Central.....	1921	17,892	10,378	28,270	13.7	2,442	1,566	626	22.0	313	22.9	4,839	139	575,571	5,041,239
	1920	3,777	38,354	42,131	6.8	....	1,724	828	24.0	373	19.4	8,600	...	629,657	5,396,395
New York Central.....	1921	84,295	51,960	136,255	10.0	26,513	1,906	816	25.3	321	20.6	7,757	133	2,344,930	17,792,860
	1920	22,852	147,056	169,908	7.1	....	1,878	929	27.2	406	20.4	12,206	...	2,465,501	17,856,411
N. Y., Chic. & St. L.....	1921	5,813	4,461	10,274	14.9	1,319	1,504	597	21.1	623	45.2	11,184	126	84,094	524,328
	1920	1,482	9,746	11,228	6.5	....	1,588	783	24.0	846	41.7	16,582	...	67,575	417,427
Pere Marquette.....	1921	10,418	7,139	17,557	11.3	1,850	1,281	607	25.3	317	19.9	2,520	165	285,656	1,370,882
	1920	3,746	19,690	23,436	6.2	....	1,262	627	25.1	293	15.0	3,125	199	290,229	1,388,496
Pitts. & Lake Erie.....	1921	16,377	8,586	24,963	11.5	4,585	2,452	1,375	40.9	143	5.7	15,916	90	113,989	580,787
	1920	3,457	22,202	25,659	9.3	....	2,444	1,436	41.6	285	10.2	32,509	102	106,081	525,525
Wabash	1921	12,857	10,215	23,072	11.1	....	1,493	633	22.9	479	30.9	4,575	178	522,953	2,689,864
	1920	4,835	16,262	21,097	12.2	....	1,380	668	24.2	641	32.9	5,593	200	534,708	2,693,857
Ohio-Indiana-Allegheny Region:															
Baltimore & Ohio.....	1921	67,773	30,971	98,744	9.3	5,570	1,497	701	30.5	368	20.4	7,008	197	1,395,295	8,908,047
	1920	19,035	77,953	96,988	6.5	....	1,696	897	32.7	605	26.2	11,378	...	1,336,420	8,072,533
Central of N. J.....	1921	18,971	10,001	28,972	23.7	3,969	1,464	725	34.1	211	10.7	8,990	216	324,321	1,489,909
	1920	3,767	18,993	22,760	7.8	4,406	1,240	680	33.6	330	15.2	11,060	...	319,937	1,335,556
Chicago & Eastern Ill....	1921	15,968	2,799	18,767	11.0	5,150	1,339	646	28.7	230	12.8	3,820	194	241,426	1,531,010
	1920	8,261	12,982	21,243	9.2	....	1,482	764	31.4	371	17.9	6,972	...	237,884	1,539,760
C., C., C. & St. L.....	1921	19,055	16,878	35,933	10.3	5,351	1,655	748	29.6	433	25.7	6,488	145	750,958	4,746,157
	1920	2,612	29,452	32,064	5.8	....	1,682	824	26.4	612	31.6	8,194	...	739,630	4,617,547
Elgin, Joliet & Eastern..	1921	10,409	4,615	15,024	5.6	3,508	2,106	1,163	40.4	258	9.2	4,632	149	(?)	(?)
	1920	7,907	8,572	16,479	6.8	....	2,195	1,209	39.5	436	16.3	8,633	...	(?)	(?)
Long Island.....	1921	1,795	3,183	4,978	4.2	655	694	268	20.9	74	5.6	940	376	195,765	1,024,482
	1920	551	6,949	7,500	4.6	....	644	270	21.0	52	3.6	981	...	181,062	924,857
Pennsylvania System....	1921	206,263	71,139	277,402	5.9	87,478	1,653	820	33.9	369	17.7	9,423	155	5,106,753	33,970,926
	1920	91,437	207,265	298,702	7.9	....	1,643	876	33.0	478	20.7	13,186	...	5,269,921	34,172,111
Phila. & Reading.....	1921	27,103	12,898	40,001	9.9	6,448	1,633	849	35.9	336	15.5	19,398	204	531,241	2,395,794
	1920	5,385	31,496	36,881	4.8	....	1,645	926	37.9	552	22.0	29,507	...	513,629	2,352,538
Pocahontas Region:															
Chesapeake & Ohio.....	1921	37,437	11,697	49,134	7.3	11,448	2,039	1,057	38.8	443	20.2	8,564	144	447,039	2,463,185
	1920	6,816	26,991	33,807	9.2	....	2,133	1,197	41.1	1,020	40.0	13,695	...	414,459	2,239,615
Norfolk & Western.....	1921	38,351	6,740	45,091	7.0	13,859	1,957	1,036	40.3	452	18.9	9,213	180	391,116	2,418,188
	1920	8,806	22,790	31,596	10.6	....	2,098	1,166	41.5	949	35.8	13,686	...	397,611	2,443,721
Southern Region:															
Atlantic Coast Line.....	1921	21,814	12,232	34,046	13.7	....	1,155	433	19.8	301	24.4	2,097	142	909,386	6,572,908
	1920	5,975	30,315	36,290	9.6	....	1,101	449	21.0	310	21.4	2,301	...	885,506	6,147,777
Central of Georgia.....	1921	4,544	4,120	8,664	18.9	....	1,071	494	24.5	439	25.6	1,994	160	324,254	1,637,596
	1920	1,432	9,059	10,491	4.5	....	1,064	518	24.6	387	20.3	2,121	...	319,434	1,671,760
I. C. (inc. Y. & M. V.)..	1921	45,085	17,949	63,034	6.6	10,943	1,505	673	28.2	549	30.8	5,621	153	1,472,422	8,993,298
	1920	11,627	42,763	54,390	6.4	....	1,573	758	29.0	860	42.7	7,606	...	1,391,363	8,147,562
Louisville & Nashville...	1921	38,415	15,750	54,165	19.5	111	1,055	486	29.4	410	23.3	4,422	182	964,202	5,334,038
	1920	12,844	28,789	41,633	8.2	94	1,060	539	29.6	648	30.6	5,373	...	905,734	5,457,454
Seaboard Air Line.....	1921	11,005	9,133	20,138	16.9	....	1,099	422	20.8	301	22.7	1,715	187	627,931	3,864,076
	1920	3,120	22,875	25,995	6.2	....	1,207	530	22.9	329	19.8	2,414	201	599,035	3,662,090
Southern Ry.....	1921	38,875	22,609	61,484	8.2	7,440	1,087	454	21.5	281	18.9	2,494	215	1,390,653	8,481,133
	1920	15,010	51,119	66,129	4.3	....	1,204	560	23.1	407	22.7	3,871	...	1,486,356	8,930,069
Northwestern Region:															
C. & N. W.....	1921	47,748	25,489	73,237	7.5	5,500	1,110	429	22.6	289	20.9	2,548	202	1,689,715	10,020,020
	1920	22,762	61,118	83,880	6.9	....	1,170	525	23.8	354	20.5	3,683	...	1,658,883	9,816,067
C., M. & St. P.....	1921	44,201	18,232	62,433	10.4	4,871	1,242	533	23.3	356	23.9	2,093	165	1,479,486	8,827,921
	1920	19,803	71,857	91,660	6.3	....	1,341	654	25.1	409	21.5	3,527	...	1,410,064	8,808,138
C., St. P., M. & O.....	1921	3,722	11,390	15,112	10.4	1,950	976	389	21.4	254	17.1	2,220	197	323,439	1,807,827
	1920	1,677	10,451	13,382	9.4	....	959	429	22.4	358	20.4	2,775	...	320,018	1,853,732
Great Northern.....	1921	46,685	9,591	56,276	13.0	....	1,335	649	25.6	254	13.5	1,794	193	1,003,570	5,838,112
	1920	18,323	28,233	46,556	8.										

Freight Station Section—A. R. A.

The first annual session of the freight station section of the American Railway Association will be held at Hotel Sherman, Chicago, on Tuesday, Wednesday and Thursday, June 21, 22 and 23. The call, signed by R. O. Wells, secretary (Chicago), advises members to secure their hotel accommodations direct, without delay, because of general congested conditions. The Pullman Company will, according to its usual custom, refund one-half the sums paid by members on Pullman cars.

The program of topics to be discussed at the meeting is embraced under five heads, namely, Freight Claim Prevention; Operation; Station Settlements; Station Traffic; General. The topics are lettered, as follows:

Freight claim prevention: A—Prevention of loss of entire package. B—Affirmative check of l.c.l. merchandise. C—Detection and correction of errors in l.c.l. freight before cars are forwarded. D—Locating concealed losses. E—Pilferage of shoes, hats and drygoods; detection of concealed losses. F—Elimination of various bureaus. G—The inspection bureau. H—Advantages of blind tally checks. I—Distinctive coloring of way-bill blanks for order shipments. J—Bonding of receiving and delivery clerks.

Operating: A—Weighing less l.c.l. freight. B—Illegible billing. C—Licensing of public cars.

Station Settlements: A—Accounting for interline switching. B—Collections and credits. C—Credits, safe method of handling. D—Forwarding of way-bills overhead for all merchandise cars, excepting local freight. E—Use of card way-bill with car instead of revenue way-bill. F—Interline waybilling. G—Desirability of universal through waybilling.

Station Traffic: A—Question of assessing charge for intercepting l.c.l. shipments at point of origin.

General: A—Organization of freight station forces in the interest of education and efficiency. B—Relation of freight station to traffic department. C—Warehouse supervision. D—Standardizing freight cars and application of the graduated minimum weight rule.

Inspection of Cars on the Interborough

The right kind of discipline of car inspectors consists in securing men so fully competent for their duties that they do not have to be disciplined. This would seem to be the lesson of the experience of the Interborough Rapid Transit Company, New York City, as interpreted by Frank Hedley, president of the company. The Interborough runs express trains every day, for hours at a time, at intervals of two minutes or less. In such an exacting traffic a delay of half a minute is liable to be the subject of an inquiry, so that the inspection of the hundreds of passenger cars (motors) in use on these trains constitutes a problem which must be dealt with in the most thoroughgoing fashion.

Mr. Hedley, in a recent address, said:

"You must, of course, have a high standard of inspection and maintenance. We maintain our motors on a mileage basis in connection with lubrication. Our motor cars make 1,200 miles before they are laid up. Then they are taken in, oiled and adjusted, the carbon brushes adjusted, the brakes adjusted, etc., and put in shape for another 1,200 miles. We do not have any terminal inspections at all. After a car runs 1,200 miles the mileage clerk puts it in the yard for inspection. We have a system of indexing all the work there is on that car. When the car comes in it is carded by the shop clerk. And this card has on it a list of every item that has to be examined. Different men are assigned to different things, and before that car goes out that card has to be filled out with the initials and number of every man who inspected his particular part of the work.

"If anything happens to that car out on the road, and it hasn't gone 1,200 miles, we know the very men that should have put it in shape to make it go 1,200 miles. If a man is at fault, he is, of course, disciplined. But we don't administer very much discipline, other than conversation, because after a man has proved himself two or three times to be careless, we can't bother with him any more. We let him go. It is much better to let him go than to suspend him. That only makes a man dissatisfied and more careless. As a result, we run frequently, day in and day out, for thirty days, without developing a single second's interference with the train movement because of defective inspection or defective equipment."

Traffic News

E. L. Dalton has been appointed traffic manager for the American Radiator Company, with headquarters at Chicago.

A. C. Holmes, traffic manager of the Empire Refineries, Inc., Tulsa, Okla., was appointed president of the Transportation Club of Tulsa at a meeting of the board of governors on May 23, succeeding J. A. Bernier.

Freight rates on vegetables, melons and apples from the Pacific Coast to eastern points are to be reduced, according to an announcement given out on June 6. On vegetables and melons the rate will be \$1.75 per 100 lb. to places east of Chicago and the Mississippi river. On apples, without the storing in transit privilege, the rate, beginning September 1, will be \$1.50 per 100 lb. This last applies to Colorado and practically all points thence east to the Atlantic seaboard.

For the third week in succession the production of soft coal has been practically stationary at approximately 8,000,000 tons, according to the weekly estimate of the Geological Survey, the total for the week ended May 28 being 8,053,000 net tons. The general trend of production continued to parallel closely that of 1919, but was below it. The average daily output for May was the lowest in any May since 1915. Shipments of soft coal from the lower lake ports, however, continued to increase during the last week in May and the total shipments for the season are well ahead of both 1918 and 1920.

Although the proposal of the transcontinental railroads to reduce rates between the Atlantic and Pacific Coast terminals on a large number of commodities especially subject to water competition has not yet reached the Interstate Commerce Commission, the Commission is already being flooded with telegraphic protests, based on the newspaper reports of the intentions of the carriers, from the representatives of the intermediate communities whose rates would not be lowered. The application of the roads for fourth section relief is, therefore, expected to stir up the old controversy over the relation of transcontinental rates.

Pacific Coast Fruit via Panama Canal

Shippers of perishable commodities from the Pacific Coast have obtained the promise of the United States Shipping Board, through R. M. Semmes, district representative in the West, of facilities for the shipment of greater quantities of Washington, Oregon and California fruits and produce to the Eastern seaboard by water, according to a statement issued in Washington.

The attitude of the board as outlined by Mr. Semmes is to place refrigeration in Shipping Board vessels, if the shippers can assure the board that the business will be a profitable one. Members of the Pacific Coast Producers' Association formed to promote shipments of fruits and vegetables through the Panama Canal, assured Mr. Semmes that all refrigerated space provided would be filled on Eastern voyages. Representatives of the association are said to be negotiating with steamship companies for a rate of 90 cents a box from Pacific to Atlantic ports. Representatives of the fruit growers say that the fruit industry is being strangled by high rail rates and that railroads have refused to give emergency rates, as was done with lumber industry, because growers had not taken advantage of competitive water routes and forced reduction.

Congress Should Keep Hands Off

The New England Traffic League, composed of leading shippers of New England, in resolutions adopted on June 8, disapproves immediate general reductions of freight rates. The resolutions say:

"Whereas, The New England Traffic League notes a tendency in various sections of the country to call for a general reduction in freight rates and . . . bills have been introduced in Congress calling for a plan of legislation whereby rates would be fixed by Congress; be it

"Resolved, That freight rates are only a small factor in the

present business depression and at this time no general reduction in freight rates can be made effective without serious harm to the carriers; adjustments of individual rates should be handled in an orderly way by application to the carriers or by complaint before the Interstate Commerce Commission as provided by law; . . . it is not for the best interests of the country to have rates made by Congress or to depart from the method of rate making as provided in the Transportation Act of 1920; and . . . the league is opposed to efforts that are being made to obtain a general reduction in freight rates prior to railroad operating costs being reduced. . . ."

Cattle Raising in Georgia

The Central of Georgia Railway, to promote cattle raising in the territory adjacent to its lines, has encouraged the farmers—one in each county—by joining in the establishment of test pastures for the purpose of demonstrating, to everyone interested, that good results can be obtained in this business in spite of obstacles formerly supposed to be prohibitive; and 46 such pastures have been sown with approved grass seed this year.

Cattle raising has been classed as a risky enterprise in the southern states because of the ravages of the Texas cattle tick, and also because the climate was supposed to be less favorable than that of the northern states; but the Agricultural Department of the railroad company decided to try to overcome the objections—the tick having been practically exterminated—and last autumn announced that it would spend \$100 in co-operation with some farmer in each one of the counties traversed by the railroad's lines; and the offer has been quickly accepted in all of the 46 counties; 12 in Alabama and 34 in Georgia. Each tract has been selected because of its suitability for pasturage, offers of land which is already producing profitable crops being rejected. Three kinds of seed were principally used, and the railroad company bought large quantities of these and sold them to the farmers at cost prices; two tons of Dallis grass, three of Carpet grass and six of Lespedeza (Japan clover), some of the seed going to farmers other than those operating the test pastures.

That beef and milk can be produced in Georgia and Alabama at a good profit has been demonstrated already, as appears from statements published in the railway company's magazine.

Shippers Ask Reductions in Freight Rates

Representatives of shippers of sand and gravel and other road building materials and also shippers of lumber held conferences at Washington on June 2 with a committee of railroad traffic executives for the purpose of urging reductions in the rates on those materials. Facts were placed before the railroad officers for the purpose of showing that high rates are preventing the movement of those kinds of freight. The lumber men said that the present rates are forcing users of lumber to look to local mills and that the railroads are losing the long haul traffic. No definite reply was given by the railroad men.

An appeal to President Harding to give his assistance in securing reductions in freight rates to "save the California fruit and vegetable growing industry from destruction" was presented to the President on June 1 by all the California members of the House of Representatives. G. W. Luce of the Southern Pacific and W. G. Barnwell of the Atchison, Topeka & Santa Fe, held a conference at Washington on June 3 with Traffic Director Hardie of the Interstate Commerce Commission and Henry J. Ford, special assistant to the commission, who has just concluded a series of conferences with railroad officers and shippers in the West on the subject of fruit and vegetable rates. The information brought out at these conferences was discussed and it was understood that a plan of adjustment involving some reductions in the rates was proposed to be submitted to the various railroads concerned.

Senator Fletcher of Florida on June 1 read in the Senate a telegram from the Florida Citrus Exchange, doubting railway testimony to the effect that the movement of perishables shows increase over last year. "It is indisputable largest percentage Florida's citrus crop in its history was not shipped this last season because price not sufficient to justify expense of shipping. The vital question is not the volume moving but the net result to producers and their ability to continue production. . . . This has been most disastrous season in every citrus area of the United States in which increased freight rates have played the big part."

Commission and Court News

Interstate Commerce Commission

The Commission has found not justified proposed new individual and joint minimum rates for less than carload shipments, between eastern points and points in Carolina, south-eastern and southeastern Mississippi Valley territory.

R. H. Countiss has filed a fourth section application with the Interstate Commerce Commission for permission, on behalf of the Southern Pacific and the Santa Fe and their steamship connections at Gulf ports, to make rates on canned goods, dried beans, barley, asphalt, condensed milk, dried fruits and rice from California terminals to New York, low enough to meet the competition of carriers using the Panama canal. Application for fourth section relief on westbound traffic has not been received by the commission. In this application permission is requested to reduce the rate on asphalt from 83.5 to 65 cents; on barley from 74.5 to 65; beans, from \$1.42 and \$1.1255, according to the minimum, to 65; condensed milk from \$1.205 to 65; dried fruits in tight containers from \$1.835 and \$1.665, according to the minimum, to 75; dried fruits in sacks from \$2.165 and \$2, according to the minimum, to 95; and rice, from \$1.00 and 92, according to the minimum, to 65 cents. A large number of requests to be heard in protest against reduced rates westbound, have been received from Spokane, Salt Lake, and Arizona and New Mexico points. No protests have been received against the proposed reduced eastbound rates.

State Commissions

The Corporation Commission of the state of Oklahoma on May 26 ruled that the railroads of that state should file tariffs before June 10, which will reduce freight charges within the state 35 per cent, passenger rates 20 per cent and Pullman rates 50 per cent. The ruling followed the denial of the plea of the carriers to extend increases granted last September.

Court News

Federal Control Did Not Suspend

Hours of Service Act

The Federal District Court for the Western District of Pennsylvania holds that the taking over by the government of the control of the railroads did not suspend the operation of the Hours of Service Act, and a railroad's officers and agents, retained in their positions by the Director General of Railroads, remained subject to the act. In an action against them for permitting employees to remain on duty for a longer period than 16 consecutive hours, it is held that the delay of a train by unavoidable accident is not a license to keep the crew of the train on continuous duty over 16 hours. To excuse such service it must be shown that the officer or agent made at least some effort to avoid excess service. *United States v. Geer*, 268 Fed. 385.

Engine Standing Near Crossing Not a

Signal of Danger as a Matter of Law

The Circuit Court of Appeals, Fourth Circuit, in a crossing accident case holds that whether a traveler on the highway has duly looked and listened is generally a question for the jury; and a standing engine, that has given no sign of movement, is not such a signal of danger that a court should hold as a matter of law that a traveler must have it under observation every moment as he approaches a public crossing. Not all reasonable men would agree that a reasonably prudent man, seeing an engine standing at rest about 100 feet from the crossing with no sign of movement, might not with a sense of safety undertake to go over the crossing after passing an obstruction of his view of only 25 feet, rely-

ing upon hearing a signal before the movement of the engine. Judgment for plaintiff was affirmed.—*Director General of Railroads v. Zanzinger*, 269 Fed. 552.

Federal Taxation Act—Allowance for Depreciation

On the question as to the amount a railroad is entitled to deduct from its gross income for depreciation under the Federal Corporation Tax Act, §38, the Circuit Court of Appeals, Sixth Circuit, holds that the measure of depreciation is the difference in the intrinsic value of the property as a whole at the beginning and end of the year, and that the enhanced value of parts through repairs and replacements should be set off against the depreciation of other parts not repaired or replaced.—*U. S. v. Nashville, Chattanooga & St. Louis*, 269 Fed. 351.

Discrimination Not Sufficient Evidence of Damage

The Federal District Court for the District of Massachusetts holds that a finding of the Interstate Commerce Commission that an unjust discrimination has been made by a railroad in making a separate charge against a shipper for switching from the pier used by him, while absorbing such charge from piers used by his competitors, is not sufficient evidence to authorize the recovery of damages by the shipper. The measure of his damages is not the amount of the unjust discrimination, but the amount by which such unjust discrimination has injured him.—*Hillsborough Mills v. Boston & Maine*, 269 Fed. 816.

Bill by Stockholders to Enjoin Consolidation of Lake Shore and New York Central Held Insufficient

The Circuit Court of Appeals, Sixth Circuit, holds that a bill to restrain the consolidation of two railroad companies (the Lake Shore and the New York Central) on the general ground that it would be a violation of the Constitution statutes and public policy of the States concerned, filed by the holder of a fraction (one thousandth) of 1 per cent. of the stock of one of the companies, purchased after the consolidation agreement was made, does not state ground for equitable relief where no objection to the consolidation is made by the State authorities, and no allegation is made showing that the complainant would suffer injuries by depreciation of stock. It is also held that section 4 of the Anti-Trust Act limits suits to enjoin violations to those brought by the government, and does not authorize a stockholder to maintain a suit to restrain his corporation from consolidating with another on the ground that it would be an illegal combination under the act.—*General Investment Co. v. L. S. & M. S.*, 269 Fed. 235.

Day and Night Telegraph Offices

The Circuit Court of Appeals, First Circuit, reversing 265 Fed. 800, holds, in a case similar to that reported in the *Railway Age* of May 20, page 1188 (*U. S. v. Cornwall & Lebanon*, 268 Fed. 680), that the language of Section 2 of the Hours of Service Act does not exclusively mean stations continuously operated throughout the 24 hours; it includes stations operated at night and by day and may include hours which are part of the day and part of the night. The opinion is a long one. The court says in part: "The words night and day were apparently used in a general sense, and not in the sense that, in and of themselves, the words were to be accepted as arbitrarily decisive of a classification based strictly upon a division between night and day." The offices in question, were Amherst and Arlington, in Massachusetts. The station at Arlington remained open from 5:45 a. m. to 9 p. m.; Amherst from 6 a. m. to 9:06 p. m. The Interstate Commerce Commission, says the court, has interpreted the phrase "continuously operated night and day" as applying to all offices operated during a portion of the day and a portion of the night. * * *

The court cites two Circuit Court of Appeals cases—one in the Fourth Circuit, *U. S. v. A. C. L.*, 211 Fed. 897, and one in the Sixth Circuit, *U. S. v. G. R. & I.*, 224 Fed. 667.—(*U. S. v. B. & M.*, 269 Fed. 89).

Extreme Rule as to Care for Passengers

Does Not Extend to Trifling Dangers

A passenger in a Pullman chair car, while walking along the aisle to the door after the car had stopped at a station, stumbled over a hassock or footstool which was in the aisle or projected into it, and fell and received an injury for which he sued the Director General of Railroads, alleging that the insufficient lighting of the car co-operated with the careless placing or leaving of the obstacle to constitute actionable negligence. From a verdict and judgment for the defendant the plaintiff appealed, contending that the instructions to the jury did not require from the defendant a sufficiently high degree of care.

The instructions put upon the defendant the duty to exercise ordinary care to see that the aisle was not obstructed by a footstool. The trial court declined to charge that the defendant was bound to exercise the highest degree of care and prudence consistent with the conduct of its business. The stricter rule imposing the more extreme liability is the one which expresses the duty of a common carrier as to all the special perils of transportation. The reason of the rule is that the passenger delivers himself into the custody and control of the carrier, that he is helpless against these perils, and that he is compelled to, and rightly does, rely upon the carrier for protection. The Circuit Court of Appeals, Sixth Circuit, affirming judgment for the defendant, says that the reason of the rule does not extend to those comparatively trifling dangers which the passenger meets while upon a railway car only in the same way and to the same extent as he meets them daily in his home or in his office or on the street, and from which he easily and habitually protects himself. The rule of merely reasonable or ordinary care, to be measured by the circumstances of the case, has been frequently applied under closely analogous circumstances. Such as the falling of a package from the parcel rack; the falling of a car window; a door sill or platform slippery with ice; baggage in the aisle; fingers caught in a door. *Bassell v. Hines*, 269 Fed. 231.

Consignee Cannot Escape Payment of Lawful

Freight Charges by Contract With Carrier

A railroad as terminal carrier sued a consignee, a commission merchant, for a balance claimed for freight and refrigeration on nine carloads of vegetables and fruit, delivered at Boston during 1911 and 1912. They were shipped in interstate commerce on straight bills of lading, but the consignee had no knowledge of their issuance or terms. When the consignee accepted the cars it paid all charges claimed. The merchandise was sold at once and the net proceeds remitted to the shippers. Later, the railroad company discovered that it had collected less than the lawful rate, and demanded the undercharges. Maintaining that it had accepted the shipments on the understanding that the charges were as reported, and had not agreed to pay more, the consignee refused the demand. Neither party was wholly successful in the courts below (230 Mass. 206). Each obtained a writ of error and a writ of certiorari to the United States Supreme Court. That court says, by Mr. Justice McReynolds:

"Commission merchants often receive from strangers shipments of perishable articles for sale at market prices. The court below held that whether York & Whitney Company impliedly agreed to pay the rates imposed by law was a question of fact to be determined upon consideration of all the circumstances. It accordingly approved a judgment, entered upon a verdict, favorable to that company as to charges upon one carload (No. 280), and in behalf of the railroad for those claimed on account of eight carloads (No. 281).

"We think . . . the liability of York & Whitney Company was a question of law. The transaction between the parties amounted to an assumption by the consignee to pay the only lawful rate it had to pay or the carrier the right to charge. The consignee could not escape the liability imposed by law through any contract with the carrier, either expressed or implied. The judgment in favor of the consignee was reversed and that in favor of the railroad was affirmed.—*N. Y. C. & H. R. v. York & Whitney*. Decided May 16, 1921.

Foreign Railway News

New Line in Chihuahua

The Mexican government has signed a contract with a mining company permitting the construction of a railway in the northern part of the Mexican state of Chihuahua, according to advices from Commercial Attache Jackson, Mexico City. The projected line is to run from Candelaria to Lamentos Mountain, a distance of approximately 80 miles.

French Railway Unions in Quarrel Over Issues

According to Paris dispatches to the *New York Times*, the organized employees of the French railways are suffering from serious internal dissension resulting from a recent vote of 55,140 to 53,667 in favor of adhering to the doctrines of the communists at Moscow. The executive council of the union is still in the hands of the moderates, however, and the radically inclined members were unsuccessful in their attempt to secure a revision in the personnel of the council. In the general disorder resulting the moderates have withdrawn from the unionists' congress and a schism has resulted which seems at present to have weakened considerably the labor movement on the railways.

Program of Ninth Congress of the

International Railway Association

The ninth congress of the International Railway Association will be held at Rome, Italy, from April 18 to May 1, 1922. The following subjects will be discussed:

Construction of Roadbed and Track—by C. H. Ewing, vice-president of the Philadelphia & Reading; K. Alberg, principal engineer of the bureau of roadway construction of the Swedish State Railways; E. F. C. Trench, chief engineer of the London & North Western; M. Henry, associate chief engineer of way and works of the Eastern Railway (France); and M. Candelier, chief engineer of surveys, plant and structures, of the Northern Railway of France.

Maintenance and Supervision of Track—by Earl Stimson, chief engineer of maintenance of the Baltimore & Ohio; C. J. Brown, chief engineer of the Great Northern (England); and G. Barbieri, chief of the works division of the Italian State Railways.

Special Steels—by W. C. Cushing, engineer of standards of the Pennsylvania; M. Mesnager, professor and director of the test laboratory of the School of Bridges and Highways (France); and M. Sand, vice-president of the directorate general of the Swiss Federal Railways.

Reinforced Concrete—by G. A. Haggander, bridge engineer of the Chicago, Burlington & Quincy; W. W. Grierson, chief engineer of the Great Western (England); C. Leemans, engineer of way and works of the Holland Railway; P. M. Buelow, chief of the bureau of engineering of the Danish State Railways; and M. Golard, chief engineer and director of special service and works of the Belgian State Railways.

Economic Production and Use of Steam by Locomotives—by G. J. Churchward, chief mechanical engineer of the Great Western (England) and M. Lacoïn, associate chief engineer of motive power and rolling stock of the Orleans Railway (France).

Trucks, Axles and Locomotive Springs—by George Hughes, chief mechanical engineer of the Lancashire & Yorkshire (England); E. Minsart, principal engineer of motive power and rolling stock of the Belgian State Railways; and M. Bochet, inspector general of mines (France).

Passenger Cars—by W. J. Tollerton, general mechanical superintendent of the Chicago, Rock Island & Pacific; R. W. Reid, carriage and wagon superintendent of the Midland (England); F. de Vargas, chief engineer of motive power and rolling stock of the Northern Railway (Spain); and M. Biard, honorary chief engineer of the Eastern Railway (France).

Electric Traction—by George Gibbs, chief engineer of electric traction of the Long Island; J. J. W. van Loenen Martinet, manager of electric traction of the Netherlands State Railways; E. Gerard, honorary secretary general of the Ministry of Railways, Marine, Posts and Telegraphs of Belgium; M. Overholm, director

of the electro-technical bureau of the Swedish State Railways; A. Donati, director of the special electrification service of the Italian State Railways; E. Huber, chief engineer of electrification of the Swiss Federal Railways; and M. Sabouret, chief engineer of technical services of the Orleans Railway (France).

Passenger Terminals—by A. S. Baldwin, vice-president of the Illinois Central; L. Maccallini, principal inspector of the directorate general of the Italian State Railways.

Freight Stations—by H. G. Kelley, president of the Grand Trunk; E. Ehrenfreund, manager of the Italian State Railways in the department of Turin; M. Moutier, assistant manager of operation of the Northern Railway (France).

Slow Freight Traffic—by W. H. Williams, vice-president of the Delaware & Hudson; V. U. Lamalle, administrative director of the Belgian State Railways; Sir H. A. Walker, general manager of the London & South Western; and E. Ehrenfreund, manager of the Italian State Railways in the department of Turin.

Locomotive Cab Signals—by A. Herdner, honorary chief engineer of motive power and rolling stock of the Midi Railway (France); and F. Villa, chief engineer of works of the Italian State Railways.

Net Cost, Rates—by Howard Elliott, chairman of the board of directors of the Northern Pacific; and Henry Gréard, chief operating assistant of the Orleans Railway (France).

Customs Examination—Messrs. Jordan and Prudent of the operating department of the Paris, Lyons & Mediterranean.

Interchange of Rolling Stock—C. W. Crawford, chairman of the general committee of Division II, Transportation, American Railway Association; M. Charron, associate chief engineer, operating department, of the Midi Railway (France).

Workmen's Dwellings—A. F. Banks, president of the Elgin, Joliet & Eastern, and F. Lolli, chief of the works division of the Italian State Railways.

Cars for Light Railways—C. Gaviraghi, director of the Haute Valteline Railways (Italy).

Operation of Light Railways, Working Rules and Regulations—by F. Level, director of the Local Interest Railways (France).

Special Methods of Traction on Light Railways—H. B. Spencer, director of the Division of Purchases of the United States Railroad Administration, and P. Biraghi of the Sicilian Society of Economic Railways.

Safety Appliances on Light Railways—by M. Bonnevie, general technical inspector of the Belgian National Society of Local Railways.

Brazil to Spend \$21,000,000 on Railways

Because of the present transportation crisis throughout Brazil the national congress has authorized the government to construct new railway lines and to improve those already existing, the funds for the work to be secured by the ordinary federal revenue and by additional credit operations, according to Commercial Attaché Schurz, at Rio de Janeiro. According to the local press the present expense budget sets aside \$1,092,000 (milreis to dollars at par) for the termination of the construction of the Sao Luiz-Caxias railway; a like amount for the prosecution of the construction on the Central of Piahy; \$928,200 for the Petrolina-Therezina railway; \$291,564 for the Cruz Alta railway; \$546,000 for the Parapanema-Rio de Peixe lines; a like amount for the Ararangua and Urussanga; and \$819,000 for the Mossoro railway. For construction on the Great Western and the Rede Bahiana, bonds of the public debt will be emitted to the amount of the respective contracts.

Besides these expenditures, the budget is said to authorize the following expenses "for the account of credit operations or other extra resources": \$1,092,000 for the San Luiz-Caxias, intended for the large bridge connecting the island of Maranhao to the continent; \$546,000 for the Central of Piahy; \$2,347,800 for the Petrolina railway; \$218,400 for the Cruz Alta; \$5,460,000 for various lines of Rio Grande do Sul and the San Pedro de Alcantara-Uberaba; \$491,400 for the construction of the Central Rio Grande do Norte; \$1,638,000 for a line at Massiaambu, in Santa Catharina; \$2,184,000 for the coal lines of Parana; \$819,000 for the Mossoro railway; and \$1,092,000 for the coal lines in Santa Catharina. The total amount authorized for these projects reaches the sum of \$21,585,564.

The government of the state of Rio Grande do Sul is negotiating in the American market for a loan of \$10,000,000 for railway improvements, according to unconfirmed press dispatches.

Equipment and Supplies

Locomotives

THE LIGONIER VALLEY is having repairs made to 2 locomotives at the shops of the Baldwin Locomotive Works.

THE INTERNATIONAL RAILWAY SUPPLY COMPANY, New York, has booked with the American Locomotive Sales Corporation, for account of the Trinidad Government Railways, 6 10-wheel freight locomotives to be constructed at the Montreal plant.

Freight Cars

THE ILLINOIS CENTRAL is asking for prices on the repair of 1,000 coal cars.

THE MISSOURI PACIFIC is asking for prices on the repair of 2,000 cars.

THE NEW YORK, ONTARIO & WESTERN is having repairs made to 250 box cars.

MITSUMI & Co., New York, reported in the *Railway Age* of April 22, as inquiring for 40 air dump cars, for the South Manchurian Railway, has ordered this equipment from the Kilbourne & Jacobs Manufacturing Company. These cars are to be of 20 cu. yd. capacity.

Iron and Steel

MITSUMI & Co., New York, has ordered from the United States Steel Products Company, 550 tons of 60-lb. rail and accessories, for use on the Hanshin Electric Railway, Japan.

THE NEW YORK CENTRAL will receive bids until 12 o'clock noon, June 23, for 1,000 tons of No. 120 Dudley section open hearth steel rails, plus 5 per cent of second quality rails, with the necessary angle bars.

THE DELAWARE, LACKAWANNA & WESTERN will receive bids until 12 o'clock noon, June 20, for steel bridge in connection with elimination of grade crossing 0.93 mile west of Mountain Lakes, N. J., and also will receive bids for 300 tons of Mayari pig iron, Pennsylvania Steel Company's specification No. 1.

Miscellaneous

THE NEW YORK CENTRAL will receive bids until 12 o'clock noon, June 20, for a minimum of 300,000 gal. and a maximum of 400,000 gal. of asphaltum base fuel oil, with gravity of 18-20 deg. Baume cold test 10 deg.

THE NORFOLK & WESTERN is asking for bids until 12 o'clock noon, June 22, at Roanoke, Va., for parts for electrical apparatus; 400 rods galvanized wire fencing; 24 steel flanged engine truck wheel tires; approximately 45,861 lb. soft steel bars; 116,711 lb. steel plates; 580,302 lb. steel shapes and repairs to electrical apparatus.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company is contemplating additions to its power house at Albuquerque, N. M., to cost approximately \$150,000.

CHICAGO, ROCK ISLAND & PACIFIC.—This company has awarded a contract to the Railway Water & Coal Handling Company, Chicago, for the construction of a new water treating plant at West Liberty, Iowa. This company is also accepting bids for the construction of a coaling station at El Reno, Okla., to replace a structure which burned, and for new coaling stations at Enid, Okla., and McFarland, Kan.

ILLINOIS CENTRAL.—This company, which was noted in the *Railway Age* of May 27 (page 1246), as accepting bids for the construction of a subway over Hawkeye Highway near Earlville, Iowa, has awarded the contract for this work to W. J. Zitterell, Webster City, Iowa, at a cost of approximately \$50,000. The company, which was noted in the same issue of the *Railway Age*, as accepting bids for an extension to its roundhouse at Paducah, Ky., has awarded the contract for this work to the Ellington-Miller Company, Chicago, at a cost of approximately \$15,000. R. L. Frazer, La Center, Ky., has been awarded the contract for improvements to the yards at Paducah, Ky., at a cost of about \$10,000. The Illinois Central has awarded a contract on its Yazoo & Mississippi Valley lines to E. H. Walsh & Company, Memphis, Tenn., for the construction of a brick yardmaster's office at Baton Rouge, La., at a cost of \$12,000.

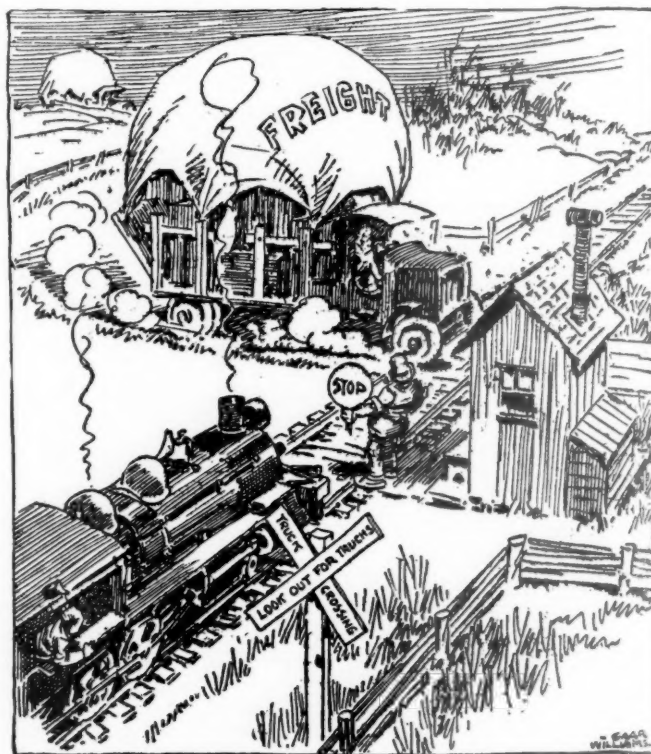
LOUISVILLE & NASHVILLE.—This company has awarded a contract to the Roberts and Schaefer Company, Chicago, for the installation of three N. & W. type mechanical cinder handling plants at Corbin, Kentucky.

MISSOURI PACIFIC.—This company has awarded a contract to Joseph E. Nelson & Sons, Chicago, for the construction of a water station at Bush, Ill., which is estimated to cost between \$40,000 and \$50,000.

SAN ANTONIO & ARANSAS PASS.—This company contemplates the construction of a new passenger station at Taft, Tex.

WABASH.—Correction.—This company, which was noted incorrectly in the *Railway Age* of June 3 (page 1295), as having awarded a contract for the construction of a passenger station at Macon, Mo., to the Unit Construction Company, St. Louis, Mo., has awarded this contract to Joseph E. Nelson & Sons, Chicago.

THE STOP-OVER PRIVILEGE at Philadelphia, which has been suspended for several years, is to be restored. This assurance has been given the Philadelphia Chamber of Commerce by officers of the three railroads. This promise is the culmination of more than a year of constant appeals of Philadelphia business firms claiming that they had lost business because purchasers from cities of the West and South have found it inadvisable to stop in Philadelphia, owing to absence of stop-over privilege on tickets.



From the Indianapolis News.

Pretty Soon

Supply Trade News

Roy G. Owens, vice-president in charge of sales of the Lakewood Engineering Company, Cleveland, Ohio, has resigned.

The Canton Foundry & Machine Company, Canton, Ohio, has removed its New York City office, from the Grand Central Palace, to 45 West Eighteenth street.

The Concrete Mixing & Placing Company has removed its office from 123 West Madison street to 802 Great Northern building, 20 West Jackson boulevard, Chicago.

T. G. Windes, Jr., sales engineer of the Refinite Company at Omaha, Neb., has been appointed sales engineer of the International Filter Company at Chicago, effective June 1.

Ward A. Miller, manager of the wire products division of the Midvale Steel and Ordnance Company at Philadelphia, Pa., has been appointed district manager of sales at the Chicago office of the company, effective June 6.

W. H. Bleecker, Jr., district sales manager at the Chicago office of the Page Steel & Wire Company, New York, has been transferred to the New York office in the same capacity, and E. J. Flood has been appointed district sales manager for all Page products at the Chicago office, 208 South La Salle street, succeeding Mr. Bleecker.

Charles A. Kothe has been appointed mechanical superintendent of the American Automatic Connector Company, Cleveland, Ohio, succeeding N. M. Barker, resigned. Mr. Kothe in 1900 entered the service of the Erie Railroad as a machinist and subsequently served in various positions at different places until 1913, when he was promoted to master mechanic at Marion, Ohio. He subsequently was transferred in the same capacity to Port Jervis, N. Y., and from 1919 served as general inspector at Youngstown, Ohio, until his recent appointment with the American Automatic Connector Company.

Colonel Washington A. Roebling, for many years vice-president of John A. Roebling's Sons Company, Trenton, N. J., has been elected president, to succeed his nephew, Karl G. Roebling, who died on May 29. Colonel Roebling, who is 84 years old, was engaged, with his father, John A. Roebling, in building the suspension bridge over the Allegheny river at Pittsburgh, and the Cincinnati and Covington suspension bridge. With his brother, Charles G. Roebling, he successfully carried out the work of completing the Brooklyn bridge, the construction of which devolved upon them after the death of their father in July, 1869.

Henry T. Gerdes, mechanical engineer and manufacturer, of New York, has been elected president of the Hauck Manufacturing Company, Brooklyn, N. Y., maker of oil burners, oil forges, oil burning appliances, etc. The other officers of the company are: M. C. Hauck, first vice-president; A. B. Hauck, second vice-president; H. H. Kress, third vice-president; A. H. Stein, treasurer, and J. Lutz, secretary. Mr. Gerdes, who succeeds the late Arthur E. Hauck as president, is a graduate of Stevens Institute of Technology. He was for many years manager of the Treadwell Engineering Company, Easton, Pa., and has a practical knowledge of the manufacture of oil burning torches and appliances.

The Manufacturers Exhibition Company, Inc., has established a permanent world market for machinery in the building occupying the block on Sixth avenue, Eighteenth street and Nineteenth street, New York City. The company's plans are broad in scope, including American and international promotion of the sale of all American manufactured mechanical products. There are exhibits of machinery of all kinds and many of the exhibitors have their own representatives in the market, but those who have no one present are repre-

sented by trained technicians who will conduct the buyers through the exhibits, explaining all points desired. L. R. Duffield, who was general manager of the Philadelphia Bourse for over ten years and recently general manager of the International Exposition of Industries, is president and general manager of the Manufacturers Exhibition Company, Inc.

The Westinghouse Electric and

Manufacturing Company

The gross earnings of the Westinghouse Electric & Manufacturing Company from sales billed for the year ended March 31, 1921, as shown by the company's annual report, were \$150,980,106, which is an increase of nearly \$15,000,000 over the gross earnings of the previous year. The manufacturing and selling cost was \$138,774,085; and the net income available for dividends was \$12,617,536, or 16.8 per cent on the company's capital stock. Dividends at the rate of 8 per cent per annum were paid during the year on both the preferred and common shares of stock.

There is included in the cost, \$5,315,196 for depreciation and adjustment of inventories, which were valued as of December 31, 1920, at a cost or market value, whichever was lower. An appropriation of \$5,000,000 from surplus for a special contingent reserve has also been made to provide for further possible shrinkages and adjustments in the inventories.

Property and plant account shows an increase over the previous year of \$9,361,404. The amount of unfilled orders on hand April 1, 1921 was \$65,621,000.

The consolidated general balance sheet follows:

ASSETS	
Property and plant.....	\$48,708,478
Investments	16,624,717
Current assets	135,339,230
Other assets	5,592,093
Total.....	\$206,264,518
LIABILITIES	
Capital Stock—	
Preferred	\$3,998,700
Common	70,813,950
Funded debt	36,275,000
Real estate, purchase money mortgage.....	60,000
Current liabilities	44,748,683
Reserves	8,102,905
Profit and loss—Surplus.....	42,265,280
Total.....	\$206,264,518

Trade Publications

LOCOMOTIVE CRANES.—The Browning Company, Cleveland, Ohio, has issued an elaborately illustrated, forty-eight-page catalog, on its locomotive cranes. The book contains a detailed description of the construction of the Browning crane, with data concerning the capacities, clearances and dimensions of the various types and a large number of illustrations showing the cranes engaged in a wide variety of work on the railways and elsewhere.

BURLINGTON COUNTY (N. J.) farmers were surprised last week by a notice from the Pennsylvania Railroad of an increase of 100 per cent in the tariff on their special daily fast freight to New York markets. The farmers say that they will at once turn to motor truck transportation. Beverly, in the heart of the rich truck-growing section of Burlington county, shipped more than 1,000 carloads of products by special train into New York markets last year. The 100 per cent increase in the cost of their special train comes on top of the 40 per cent increase in freight rates made last summer. To obtain the special train the farmers pay the regular freight rate, plus an extra tariff. This tariff last year cost them \$102 extra a day and they arranged for the service at the same rate this year. Then the railroad gave notice that the special charge would be increased to \$205 daily this year. The railroad had overlooked in its first estimated order No. 11,241 of the Interstate Commerce Commission issued Jan. 5 of this year, which raised the mileage charge for all special freight trains from \$1.25 to \$2.50.

Railway Financial News

ATCHISON, TOPEKA & SANTA FE.—To Continue Dividends in 1921.—This company expects to continue the present dividend rates on both its preferred and common stocks throughout 1921, according to a statement of President W. B. Storey made at the close of the board meeting on June 7, at which the regular semi-annual dividend of 2½ per cent was declared on the preferred stock. The Wall Street Journal quotes Mr. Storey as saying:

Even if the Labor Board's wage decision had not been made, the company had plans in mind whereby the dividends could be kept up at the expense of a most rigid program of economy on upkeep. This would have been accomplished without neglecting the safety of the lines and in a way that would meet all traffic demands. It would have meant an increased amount of work in the future to take care of the company's natural growth and expansion. But even with the wage decrease, the company will still have to curtail to some extent on upkeep and improvement in order to carry out its decision to keep the dividends going. Under present depressed traffic conditions the wage reduction was not sufficient, but the decrease showed that the Board had taken proper consideration of the importance of the matter.

The wage reduction should cause no expectation that rates will come down. They will only come down if the volume of business increases to a point where the carriers can take the business at a lesser cost than at present. To give an example of how the company has economized in order to meet requirements, since December 16,000 men have been laid off at a saving of about \$3,000,000. Under good conditions nearly all of these would have been necessary for work in connection with the road's natural growth. In view of the wage reduction some of them will be put back on, but the number will be regulated not so much by the reduction as by the way in which business picks up.

May and June should show much better than the earlier months of the year in earnings, but an appreciable improvement is not looked for until July. In that month the Atchison especially is favored by heavy grain business.

The flood in Pueblo has cost the company several hundred thousand dollars and has caused a temporary cessation of both passenger and freight traffic to certain points in that vicinity. The California business has not been hurt since transcontinental business regularly routed through Pueblo has been diverted to the road's southern lines, but business into Denver will be held up for about ten days.

BALTIMORE & OHIO.—Authorized to Assume Obligations.—This company has been authorized by the Interstate Commerce Commission to assume obligation of liability in respect of \$675,000 of equipment trust, 6 per cent gold notes issued by the Bethlehem Steel Company in connection with the purchase of 549 steel hopper cars.

CENTRAL OF NEW JERSEY.—Authorized to Assume Liability.—This company has been authorized by the Interstate Commerce Commission to assume obligation or liability as guarantor in respect of the payment of principal and interest of \$4,987,000 of bonds of the American Dock & Improvement Company, the maturity date of which is to be extended.

CHARLES CITY WESTERN.—Asks Authority to Issue Notes.—This company has applied to the Interstate Commerce Commission for authority to issue \$384,000 of 10-year, 6 per cent gold notes to retire an outstanding issue of 7 per cent bonds and other maturities.

CHICAGO, ROCK ISLAND & PACIFIC.—Authorized to Issue Lease Warrants.—This company has been authorized by the Interstate Commerce Commission to issue six lease warrants for \$158,885.54 each in connection with the procurement of 30 steel coaches and five steel chair cars from the Pullman Company.

CHICAGO, TERRE HAUTE & SOUTHEASTERN.—Authorized to Issue Notes.—This company has been authorized by the Interstate Commerce Commission to issue 7 per cent promissory notes to the amount of \$837,000 to refund the amount remaining unpaid of its outstanding 7 per cent demand notes and to pledge as collateral for the notes all or part of \$1,485,000 of its first and refunding mortgage 5 per cent gold bonds.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—Authorized to Issue Bonds.—This company has been authorized by the Interstate Commerce Commission to issue \$1,052,600 of refunding and improvement mortgage bonds and use them in the acquisition of the capital stock of the Evansville, Indianapolis & Terre Haute.

EVANSVILLE, INDIANAPOLIS & TERRE HAUTE.—Authorized to Issue Bonds.—This company has been authorized by the Inter-

state Commerce Commission to issue \$400,000 of its first mortgage 7 per cent, 30-year bonds and to pledge them with the Secretary of the Treasury as collateral security for a loan from the United States of \$400,000 to assist it in making additions and betterments estimated to cost \$800,000.

GRAND TRUNK.—Defaulted Interest to Be Paid.—The New York agency of the Bank of Montreal announced on June 3 that it would pay coupons due on April 1, 1921, detached from Grand Trunk Pacific Railway 4 per cent mortgage, Prairie section, Series A, and Mountain section, Series B, and Lake Superior Branch bonds. The payment of the interest on these bonds, amounting to approximately \$500,000, has been in technical default since April 1.

LONG ISLAND.—Authorized to Issue Bonds.—This company has been authorized by the Interstate Commerce Commission to issue \$3,876,000 of refunding mortgage 4 per cent gold bonds and to exchange them for a like amount of its unified mortgage 4 per cent gold bonds. The Pennsylvania is also authorized to guarantee the principal and interest of the refunding mortgage bonds.

MASON CITY & FT. DODGE.—June 1 Interest Defaulted.—The controlling road, the Chicago Great Western, has officially announced that the interest due June 1, 1921, on the first mortgage 4 per cent, 50-year gold bonds will not be paid. The bondholders' protective committee, formed last November, with Mortimer N. Buckner, president of the New York Trust Company, as chairman, states:

The committee in December last advised holders of the bonds that the payment of the June 1, 1921 installment of interest, as well as subsequent installments, was seriously imperiled, and that a situation existed which made it imperative in the interests of the holders of the bonds to examine into the affairs of the railroad company and its operation, maintenance and management by the Chicago Great Western, and to take concerted action for the establishment and enforcement of their rights and the protection of their interests. A very substantial amount of the bonds has since been deposited with the committee, and the detailed examination referred to is now being conducted. In compliance with the request of holders of undeposited bonds and in order to afford further opportunity to avail of the benefits of the deposit agreement, the committee has extended the time within which bonds may be deposited with the New York Trust Company, 26 Broad street, New York City, depository, or with the Illinois Trust and Savings Bank, Chicago, sub-depository, to and including June 20, 1921, after which date further deposits will not be received except at the option of the committee and upon such terms and conditions as the committee shall prescribe.

MISSOURI, KANSAS & TEXAS.—Authorized to Issue Notes.—The receiver has been authorized by the Interstate Commerce Commission to issue \$450,000 of receivers' equipment notes and to pledge them with the Secretary of the Treasury as security for a loan. The authority previously granted to issue \$675,000 of equipment notes has been revoked.

NORFOLK & WESTERN.—Authorized to Sell Bonds.—This company has been authorized by the Interstate Commerce Commission to sell at not less than par and accrued interest \$269,000 of convertible, 4 per cent, gold bonds, 1,213,000 of convertible 4½ per cent gold bonds and \$522,000 of convertible 6 per cent gold bonds, the unsold remainders of three issues which were authorized for general corporate purposes prior to June 28, 1920.

NORWOOD & ST. LAWRENCE.—Authorized to Sell Bonds.—This company has been authorized by the Interstate Commerce Commission to sell or issue in exchange for certain outstanding promissory notes \$199,000 of first mortgage 5 per cent gold bonds for the purpose of satisfying certain existing liabilities and to issue promissory notes for \$16,969.50 in connection with the purchase of a locomotive.

PENNSYLVANIA.—Asks Authority to Lease Roads.—This company has applied to the Interstate Commerce Commission for authority to lease the railroad and property of the Pittsburgh, Chicago & St. Louis and the Grand Rapids & Indiana for 999 years from January 1, 1921.

To Pay Notes.—The \$24,469,322 4½ per cent notes due June 15 will be paid off at maturity at the offices of the company, Broad Street Station, Philadelphia, Pa., or at 85 Cedar Street, New York City.

PERE MARQUETTE.—Authorized to Issue Notes.—This company has been authorized by the Interstate Commerce Commission to pledge and repledge from time to time \$3,231,000 of its first mortgage, 5 per cent bonds of 1916 as collateral security for short

term notes, but the commission withholds authority applied for to issue notes for a sum not exceeding \$2,100,150 in its present financial condition, because no information has been furnished by the applicant as to the terms of the notes.

READING COMPANY.—Decree Form Filed.—The form of decree by which the Reading Company properties will be separated in compliance with the decision of the United States Supreme Court was filed in the United States District Court at Philadelphia on June 6. It was drawn up in accordance with the plan recently approved by the court and was submitted by counsel for the Reading Company. Under the decree the Reading Coal and Iron Company will be separated from the Reading Company and the latter will be merged with the Philadelphia & Reading Railway under a new name and will be subject to the regulations of the federal and state laws as a common carrier. The only trustee named in the plan of segregation is the Central Union Trust Company of New York, to take over the stock of the Lehigh and Wilkes-Barre Coal Company from the Central Railroad of New Jersey. The other trustees, who will hold the stock of the Jersey Central, owned by the Reading, until a favorable time arrives for its sale, have not been named. Neither is the name of the new coal company to be formed given in the decree.

New Director.—Charles Ewing, vice-president of the Philadelphia & Reading, has been elected a director to succeed Isaac Heister, deceased.

SOUTHERN RAILWAY.—Application for Loan Withdrawn.—This company has withdrawn its application to the Interstate Commerce Commission for a loan of \$3,825,000 from the revolving fund and the commission has cancelled the certificate. The commission has also vacated its order of December 31, in so far as it authorized the Southern Railway to pledge \$5,900,000 of general mortgage bonds as security in part for the loan, but authority has been granted to the company to pledge and repledge from time to time all or part of \$7,229,000 of its development and general mortgage 4 per cent gold bonds as collateral security for short term notes.

ST. LOUIS-SAN FRANCISCO.—Voting Trust to Expire.—The voting trust for the preferred and common stock will expire by limitation on July 1 and will not be extended. Preparations are now being made for the exchange of stock certificates for the voting trust certificates.

TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS.—Asks Authority to Issue Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue \$719,000 of general mortgage, 4 per cent bonds to reimburse the treasury for expenditures made from income in 1920. The bonds are to be sold on a 6 per cent basis through the Central Union Trust Company.

TONOPAH & GOLDFIELD.—New Director.—Walter L. Hachnlen has been elected a director.

UNION PACIFIC SYSTEM.—Annual Report.—The income for the calendar year 1920, compared with the calendar year 1919, after excluding all offsetting accounts between the Union Pacific Railroad Company, the Oregon Short Line Railroad Company and the Oregon-Washington Railroad & Navigation Company, is as follows:

	1920	1919	Increase or Decrease
Operating revenues (March 1 to December 31)	\$175,260,837	.....	\$175,260,837
Operating expenses (March 1 to December 31)	135,112,026	.....	135,112,026
Revenues over expenses (March 1 to December 31)	\$40,148,811	.....	\$40,148,811
Rental from United States Railroad Administration	7,099,453	\$39,369,411	—32,269,958
Railway operating income	\$47,248,264	\$39,369,411	\$7,878,853
Operating expenses, corporate, not assumed by United States Railroad Administration	\$191,217	\$909,343	—\$718,126
Federal income and other taxes	10,754,015	2,293,226	8,460,789
Total corporate expenses and taxes	\$10,945,232	\$3,202,569	\$7,742,663
Railway operating income over corporate expenses and taxes	\$36,303,032	\$36,166,842	\$136,190
Other income, representing rents received and incidental operations ..	1,492,885	527,183	965,701
Total income from railroad properties	\$37,795,917	\$36,694,026	\$1,101,891

Deductions, representing rents paid, hire of equipment and incidental operations	1,833,655	144,926	1,688,729
Net income from railroad properties	\$35,962,262	\$36,549,100	—\$586,838
Income from investments and other corporate income	12,298,956	13,026,686	—727,730
Total income from all sources ..	\$48,261,218	\$49,575,786	—\$1,314,568
Interest on funded debt and miscellaneous corporate charges	15,586,987	15,156,573	430,414
Net income from all sources	\$32,674,231	\$34,419,213	—\$1,744,482
Dividends on stock of Union Pacific Railroad Company:			
Preferred stock at 4 per cent ..	\$3,981,740	\$3,981,740	.....
Common stock at 10 per cent ..	22,229,160	22,229,160	.....
Sinking fund requirements	10,877	11,377	—500
Total appropriations of net income	\$26,221,777	\$26,222,277	—\$500
Surplus, transferred to profit and loss ..	\$6,452,454	\$8,196,937	—\$1,744,482

The annual report of the Union Pacific will be reviewed editorially in an early issue.

WICHITA NORTHWESTERN.—Asks Authority for Mortgage.—This company has applied to the Interstate Commerce Commission for authority to place a first mortgage for \$600,000 on its property to secure a loan from the United States of \$381,750, or, if arrangements can be effected, for \$431,750; also to retire \$200,000 of an outstanding mortgage of \$181,750 for additions and betterments.

Settlements With Railroad Administration

The United States Railroad Administration reports the following final settlements, and has paid out to the several roads the following amounts: Carolina, Clinchfield & Ohio, \$550,000; Oregon Electric, \$90,000; Oregon Trunk, \$100,000; Farmers Grain & Shipping Company, \$25,000; Southern Illinois & Missouri Bridge Company, \$40,240.10; Baltimore Steam Packet Company, \$820,000. The payment of these claims on final settlement is largely made up of balance of compensation due, but includes all other disputed items as between the railroad companies and the administration during the 26 months of federal control.

Guaranty Certificates Issued

The Interstate Commerce Commission has issued certificates for partial payments by the Treasury on account of the six months' guaranty period to the railroads for 1920, as follows:

Ann Arbor	\$75,261
Arizona Eastern	390,000
Cincinnati, Saginaw & Mackinaw	90,000
Detroit, Grand Haven & Milwaukee	250,000
Detroit & Huron	7,500
Galveston, Harrisburg & San Antonio	150,000
Houston, East & West Texas	145,000
Houston & Texas Central	900,000
Maryland & Pennsylvania	60,000
Michigan Air Line	30,000
Missouri & North Arkansas	27,000
New York & Pennsylvania	15,000
Ohio River & Western	70,000
Pontiac, Oxford & Northern	110,000
Toledo, Saginaw & Muskegon	75,000

The commission has also reached a final determination of the amount of the guaranty of the Ann Arbor and has issued a certificate for the balance of \$75,261.85 due the carrier, which has already received partial payments amounting to \$240,000.

Dividends Declared

Atchison, Topeka & Santa Fe—Preferred, 2½ per cent, semi-annually, payable August 1 to holders of record June 30.
Beech Creek—50 cents, quarterly, payable July 1, to holders of record June 15.
Delaware & Hudson—2½ per cent, quarterly, payable June 20, to holders of record May 28.
Kansas City, Ft. Scott & Memphis—Preferred, \$1 quarterly, payable July 1 to holders of record June 24.
New York, Chicago & St. Louis—1st preferred, 2½ per cent, payable July 2 to holders of record June 20.
New Orleans & Northeastern—6 per cent, payable June 29 to holders of record June 15.
New York & Harlem Common and preferred, \$2.50, payable July 1 to holders of record June 15.
New York, Lackawanna & Western—1½ per cent, quarterly, payable July 1 to holders of record June 14.
Pittsburgh, McKeesport & Youghiogheny—\$1.50, payable July 1 to holders of record June 15.
St. Louis, Rocky Mt. & Pacific—Common, 1 per cent quarterly; preferred, 1½ per cent, quarterly; both payable June 30 to holders of record June 18.

Railway Officers

Executive

T. S. Rowland, vice-president, secretary and treasurer of the Chicago, Burlington & Quincy, has resigned as secretary and treasurer, effective May 26. He will continue to serve as vice-president.

E. E. Nash, general manager of the Minneapolis & St. Louis, with headquarters at Minneapolis, Minn., has been elected vice-president and general manager, with the same headquarters, effective June 3.

V. V. Boatner, superintendent of the Memphis division of the Yazoo & Mississippi Valley, with headquarters at Memphis, Tenn., has been elected president of the Peoria & Pekin Union, with headquarters at Peoria, effective June 1.

C. I. Twyman, division passenger agent of the Chicago, Burlington & Quincy, with headquarters at Galesburg, Ill., has been promoted to general agent, passenger department, with headquarters at St. Paul, Minn., succeeding F. M. Rugg, deceased.

Carl Nyquist, secretary and treasurer of the Chicago, Rock Island & Pacific, with headquarters at Chicago, has been elected vice-president, effective June 1. He will retain his duties and title of secretary and treasurer. Mr. Nyquist was born at Chicago on November 17, 1877, and entered railway service on March 3, 1898, in the department of the secretary and treasurer of the Rock Island at Chicago, and has served continuously in that department since then. In 1910 he was promoted to assistant secretary, and later was appointed assistant treasurer in addition to his other duties. In July, 1918, during the reorganization accompanying federal control, Mr. Nyquist was appointed federal treasurer of the Rock Island. He resigned this position on November 1, 1918, to accept election as secretary and treasurer of the corporation, succeeding George H. Crosby, vice-president, who had retired.



C. Nyquist

Operating

J. M. Walsh, superintendent of the Memphis terminal division of the Yazoo & Mississippi Valley, with headquarters at Memphis, Tenn., has been transferred to the Memphis division, with the same headquarters, succeeding V. V. Boatner, resigned to become president of the Peoria & Pekin Union. **E. Bodamer**, trainmaster, with headquarters at Memphis, succeeds Mr. Walsh. **J. A. Zanone** has been appointed trainmaster, succeeding Mr. Bodamer. The appointments and changes were effective June 1.

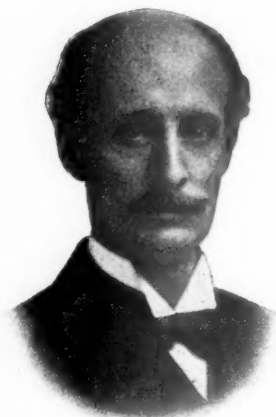
W. J. Edwards, superintendent of the Alabama Great Southern, has been promoted to general superintendent of the Southern with headquarters at Chattanooga, Tenn., succeeding F. P. Pelter, resigned. **M. E. Madden**, superintendent of the Georgia Southern & Florida, has succeeded Mr. Edwards as superintendent of the Alabama Great Southern with headquarters at Birmingham, Ala. **L. F. De Ramus**, train-

master of the Georgia Southern & Florida, has succeeded Mr. Madden as superintendent, with headquarters at Macon, Ga. **L. O. Perkins**, trainmaster of the Northern Alabama with headquarters at Sheffield, Ala., has succeeded Mr. De Ramus as trainmaster of the Georgia Southern & Florida, and **H. A. DeButts** has succeeded Mr. Perkins as trainmaster of the Northern Alabama. These changes were effective June 4.

Financial, Legal and Accounting

H. W. Johnson, assistant controller of the Chicago, Burlington & Quincy, with headquarters at Chicago, has been promoted to controller, with the same headquarters, effective May 26, succeeding C. I. Sturgis, elected secretary and treasurer.

C. I. Sturgis, controller of the Chicago, Burlington & Quincy, with headquarters at Chicago, has been elected secretary and treasurer, effective May 26. Mr. Sturgis was born at Paris, France, on July 21, 1860, and entered railway service in 1880, as a clerk in the local freight office of the Burlington at Chicago. His entire railway service, amounting to forty-one years, has been spent with that company. After serving in various positions in the Chicago offices, Mr. Sturgis was appointed cashier with headquarters at Denver, Colo., and later was returned to Chicago as paymaster. He served in this position until February 1, 1895, when he was promoted to assistant general auditor, with the same headquarters. Mr. Sturgis served successively in this position and as general auditor of the Burlington for twenty-three years. On September 1, 1918, he was promoted to controller, retaining his headquarters at Chicago, and was serving in this position at the time of his recent election.



C. I. Sturgis

Traffic

H. A. Williams has been appointed district freight representative of the Baltimore & Ohio, with headquarters at Milwaukee, Wis., effective June 1.

J. W. Britt has been appointed general agent of the transportation and traffic departments of the New York Central, Lines West, with headquarters at Detroit, Mich., effective June 1.

Mechanical

Reinier Beeuwkes, electrical engineer, of the Chicago, Milwaukee & St. Paul, has been granted a leave of absence for several months and has gone to South America with his family.

C. M. Hoffman, superintendent of machinery of the Verde Tunnel & Smelter railroad, with headquarters at Clarkdale, Ariz., has been appointed superintendent motive power and machinery of the Los Angeles & Salt Lake, with headquarters at Los Angeles, Cal., effective June 1, succeeding D. P. Kellogg, who has resigned.

Obituary

A. L. Kuykendall, assistant superintendent of the Southern Pacific, Texas lines, with headquarters at Houston, Tex., was killed in a motor car accident near Garrison, Tex., on May 25.